



# Arborway Master Plan

## The Arborway

## Jamaica Plain, Massachusetts

**RIZZO**  
ASSOCIATES

A TETRA TECH COMPANY



**Pressley**  
Associates, Inc.

Prepared by:  
Rizzo Associates

April 2004



RIZZO

ASSOCIATES

A TETRA TECH COMPANY

One Grant Street  
Framingham, MA 01701-9005  
(508) 903-2000  
(508) 903-2001 fax  
[www.rizzo.com](http://www.rizzo.com)

April 22, 2004

Ms. Margaret M. Dyson  
Director of Historic Parks  
Boston Parks and Recreation Department  
1010 Massachusetts Avenue, 3rd Floor  
Boston, MA 02118

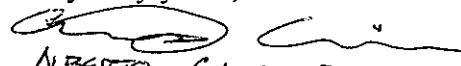
**Re: The Arborway Master Plan - Final Report  
Jamaica Plain, Massachusetts**

Dear Ms. Dyson:

Rizzo Associates, Inc. is pleased to submit this Final Report for the Arborway Master Plan in Jamaica Plain, Massachusetts. This report includes a thorough analysis of the Arborway corridor, and a comprehensive set of recommendations detailing the Master Plan's Preferred Alternative. The report addresses historic landscape treatment, pedestrian and bicycle accommodation, and motor vehicle traffic operations.

We trust that it will satisfy your needs for the review of this project. If you have any questions, please contact me or Ned Codd, Project Manager, at 508-903-2094.

Very truly yours,

  
ALBERTO CAJIAO FOR

Richard S. Bryant, P.E.  
Vice President



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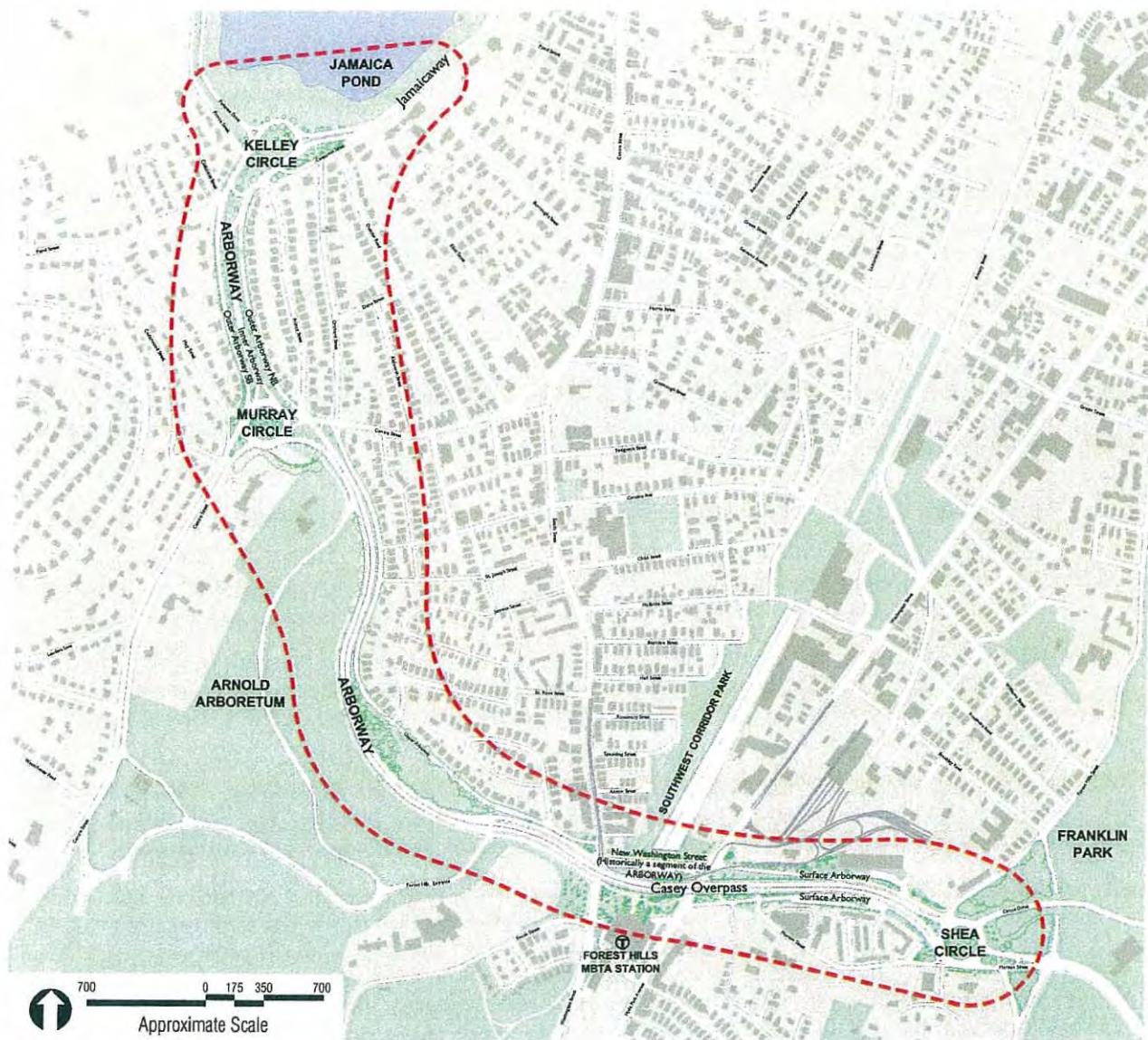
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## Executive Summary

The Arborway is a historic parkway that runs through Boston's Jamaica Plain neighborhood. Designed by Frederick Law Olmsted and completed in 1897, the Arborway is the southernmost component of the Emerald Necklace park system. The Arborway extends from the southern end of the Jamaicaway at Jamaica Pond, past the Arnold Arboretum and Forest Hills, terminating at Shea Circle at the southwestern corner of Franklin Park. It connects three of Boston's largest park spaces, Jamaica Pond at the northern end, Arnold Arboretum in the middle, and Franklin Park at the southern end. The Arborway in its current form is shown in Figure 1.



**Figure 1** Arborway Corridor

The Arborway fulfills a number of different roles. As noted above, it is a historic landscape and a cultural resource. It is also a green space in its own right: a parkway connecting three major parks, and a regional recreation destination. At the same time, it is a local residential street, with homes fronting directly on the Outer Arborway.

roadways and the Upper Arborway. Finally, the Arborway is a regional motor vehicle route, with high traffic volumes and high speeds.

These differing roles have resulted in changes to the Arborway, and in conflicts among different users. As demographics and travel behavior have changed, and automobile travel has increased dramatically, the Arborway has become a more popular and heavily traveled motor vehicle route. In response to this increasing automobile demand, a number of major changes have been made to the Arborway's design. The changes increased the amount of space devoted to roadways and eliminated significant elements of the historic landscape, including many of the red oaks lining the roadway edges, a key element of the original Olmsted design. These changes have had significant negative impacts to the Arborway's character.

The changes to the Arborway have also created barriers, such as rotaries with wide stretches of pavement and heavy volumes of high-speed traffic, that have discourage recreational users. The physical and visual obstacle of the Casey Overpass dominates the Forest Hills segment of the Arborway corridor, which is the connection between the Arnold Arboretum and Franklin Park.

In response to these issues, the Boston Parks and Recreation Department has undertaken the Arborway Master Plan, in association with the Metropolitan District Commission and with financial support from the Commonwealth of Massachusetts Department of Conservation and Recreation's Historic Landscape Preservation Grant Program. The Boston Parks and Recreation Department retained the Rizzo Associates Team to execute the Arborway Master Plan, and charged the Rizzo Team with enhancing the historic landscape and improving pedestrian and bicycle conditions, while still accommodating the Arborway's motor vehicle traffic demand without excessive congestion.

The Arborway Master Plan is designed to propose a vision for improvements to the Arborway that will maximize the benefits and minimize the impacts for these three interests: the historic parkway landscape, pedestrian and bicycle access, and motor vehicle traffic safety and operations. The Arborway Master Plan Final Report summarizes the study and its findings, and includes the following principal components:

- 1. Introduction.** The study introduction describes the study area, identifies the study purpose and needs, and states the study goals and objectives.
- 2. Historic Background.** This section describes historic context that led to the creation of the Arborway, the original design and construction of the Arborway, and subsequent changes to the Arborway.
- 3. Existing Conditions.** This section summarizes the current conditions in the three principal areas of investigation: the original design of the historic landscape and its subsequent changes, the pedestrian and bicycle usage of the Arborway and the existing challenges, and the current motor vehicle demand and traffic operations.
- 4. Alternatives Analysis.** The alternatives analysis section describes the process of proposing and screening potential improvement alternatives for the Arborway corridor, the most advantageous alternatives that were examined in detail, and the advantages and disadvantages of each alternative.
- 5. Arborway Master Plan Recommendations.** The final section summarizes the study recommendations, including the long-term Preferred Alternative, which is based on the most advantageous alternatives and incorporates other features that enhance its benefits and reduce its negative impacts. The report also includes short-term recommendations that can be implemented without major roadway changes, order-of-magnitude cost estimates for the Preferred Alternative and the short-term recommendations, and an identification of outstanding issues that should be dealt with in subsequent planning and design phases.

## Historic Background

The Arborway was originally designed and built in the late nineteenth century as a scenic parkway. In the original Frederick Law Olmsted design, the Arborway's character was defined by a linear parkway, with separate and distinct travel ways for different travel modes (footpath, bridle path, carriage ways, and automobile ways) lined with regular rows of shade trees.

Much of the Arborway still retains a sense of the original character of a linear park, with roadways lined by rows of tall oak trees, but that character has been diminished or eliminated in many areas. As the residential neighborhoods surrounding the Arborway were developed, and automobile travel became more prevalent, traffic on the Arborway increased. The design of the Arborway was changed throughout the 20<sup>th</sup> century to accommodate the higher traffic volumes and speeds.

The introduction of the three rotaries, Shea Circle in 1925, Murray Circle in 1932, and Kelley Circle in 1943, eliminated much of the historic landscape at these locations. In 1953, the Casey Overpass was completed, eliminating most of the original rows of oaks and dramatically changing the historic landscape between the Arnold Arboretum and Franklin Park. In the same year, the section of the Arborway adjacent to the Arnold Arboretum was widened, eliminating the bridle path and a row of oak trees. Therefore, the only segment of the Arborway that has not been altered significantly from its original design is the three-roadway section between Kelley Circle and Murray Circle. Figure 2 shows the original Olmsted design for the Arborway, in contrast to existing conditions.

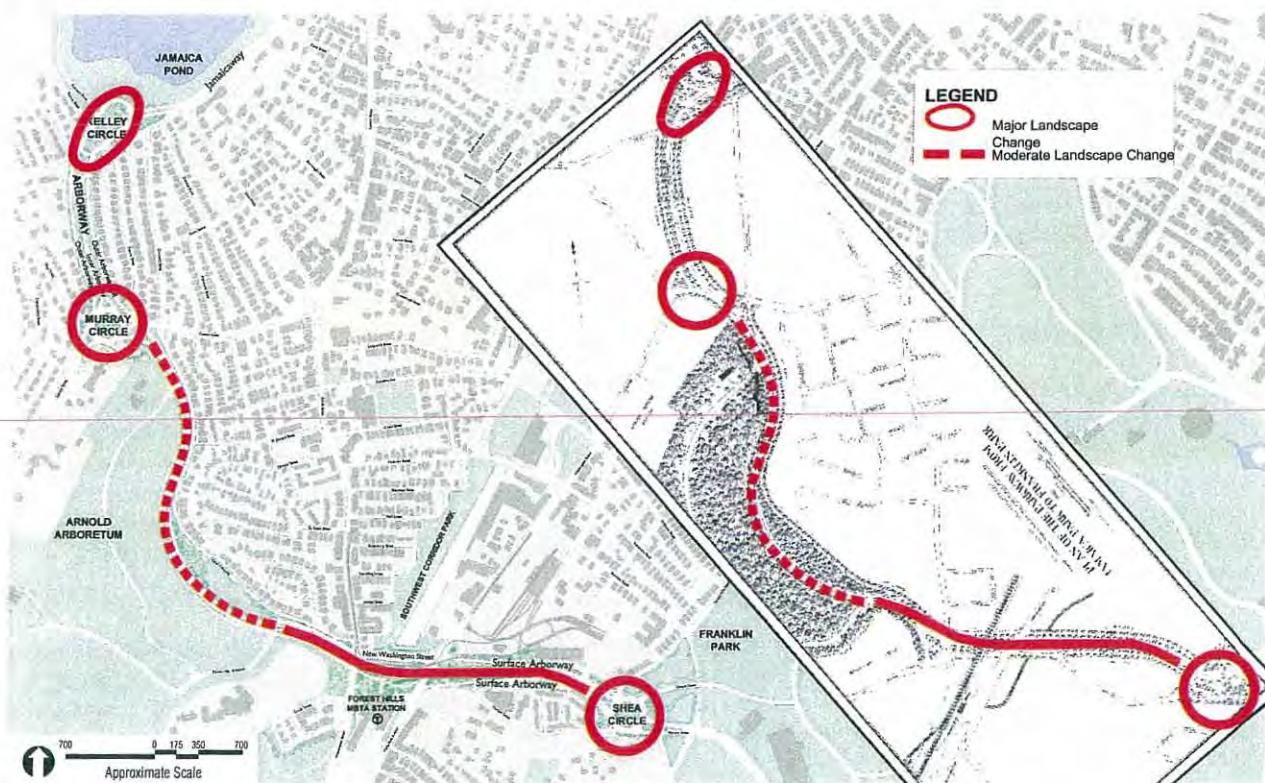


Figure 2 Existing Conditions & Olmsted Design

## **Existing Conditions**

As noted above, the Arborway was designed as a multi-modal corridor, with footpaths and a bridle path in addition to carriage ways and automobile ways. The Arborway continues to be an important corridor for non-motorized travel. Pedestrians and bicyclists use the Arborway as a linear connection along the Emerald Necklace. Pedestrians and bicyclists from the local Jamaica Plain neighborhoods also use the Arborway as a connection to their local parks: Jamaica Pond, the Arnold Arboretum, and Franklin Park.

However, the current design of the Arborway presents significant challenges for pedestrians and bicycles. Rotaries are designed to facilitate motor vehicle mobility by keeping the traffic moving constantly. The Arborway rotaries are particularly large, which enables vehicles to travel through them at high speeds. This makes pedestrian and bicycle crossings difficult and potentially dangerous. In addition, the Casey Overpass creates a physical and visual barrier through the segment of Arborway that should connect the Arnold Arboretum and Franklin Park.

The combination of the Arborway's current design and the connections that it provides make it a major motor vehicle route. It carries high traffic volumes, approximately 46,000 – 48,000 vehicles each weekday adjacent to the Arnold Arboretum and through the Forest Hills area (including both the Casey Overpass and the parallel surface roads). Because Centre Street and Parkman Drive add heavy traffic volumes to the Arborway – Jamaicaway traffic flow, the Arborway between Kelley Circle and Murray Circle carries even higher traffic: approximately 58,000 vehicles each weekday, and about 4,500 vehicles during the hour of heaviest demand in each commuter peak period, both morning and afternoon.

The Arborway's rotaries, overpass, and large paved areas keep this traffic flowing, but the current situation has negative impacts. Motor vehicles travel through the Arborway corridor at high speeds, and there have been a significant number of traffic accidents in the corridor. The space devoted to motor vehicles has eliminated elements of the original landscape, and this paved area continues to prevent the restoration of any lost historic landscape. The high traffic volumes and high speeds create obstacles for pedestrians and bicycles traveling along or across the Arborway, and have negative impacts on residents on and near the Arborway.

## **Alternatives Analysis**

The Arborway Master Plan evaluated alternatives for improvements to the Arborway corridor in two principal stages. In the preliminary alternatives analysis, a wide variety of potential improvements was proposed throughout the Arborway corridor. The alternatives were all designed to satisfy the study's goals and objectives by enhancing the Arborway landscape and improving pedestrian and bicycle access, while still satisfying the motor vehicle demands by accommodating traffic more efficiently and with less paved area. The preliminary alternatives were also screened for fatal flaws, including negative impacts to extant elements of the original Olmsted landscape or unacceptable levels of motor vehicle congestion.

The alternatives that showed promise in the initial screening were then developed into full design alternatives, and these alternatives were evaluated to identify benefits and impacts with respect to historic landscape, pedestrian and bicycle access, and motor vehicle traffic. The Arborway sections that show the most potential for major landscape and pedestrian / bicycle improvements are the three rotaries: Kelley Circle, Murray Circle, and Shea Circle.

Two main alternatives were reviewed for the segment of the Arborway between Kelley Circle and Murray Circle: an alternative that replaces the large rotaries with smaller “modern roundabouts,” and an alternative that replaces the rotaries with signalized intersections. Similarly, two alternatives were evaluated for Shea Circle: one that replaces the rotary with a modern roundabout and one that replaces it with a signalized intersection. The Forest Hills / Casey Overpass segment of the Arborway was analyzed for opportunities to improve pedestrian and bicycle access, and potential changes and/or elimination of the overpass. Based on each alternative's potential roadway changes, appropriate landscape, tree planting, and pedestrian / bicycle access enhancements were also proposed for each alternative.

## Arborway Master Plan Recommendations

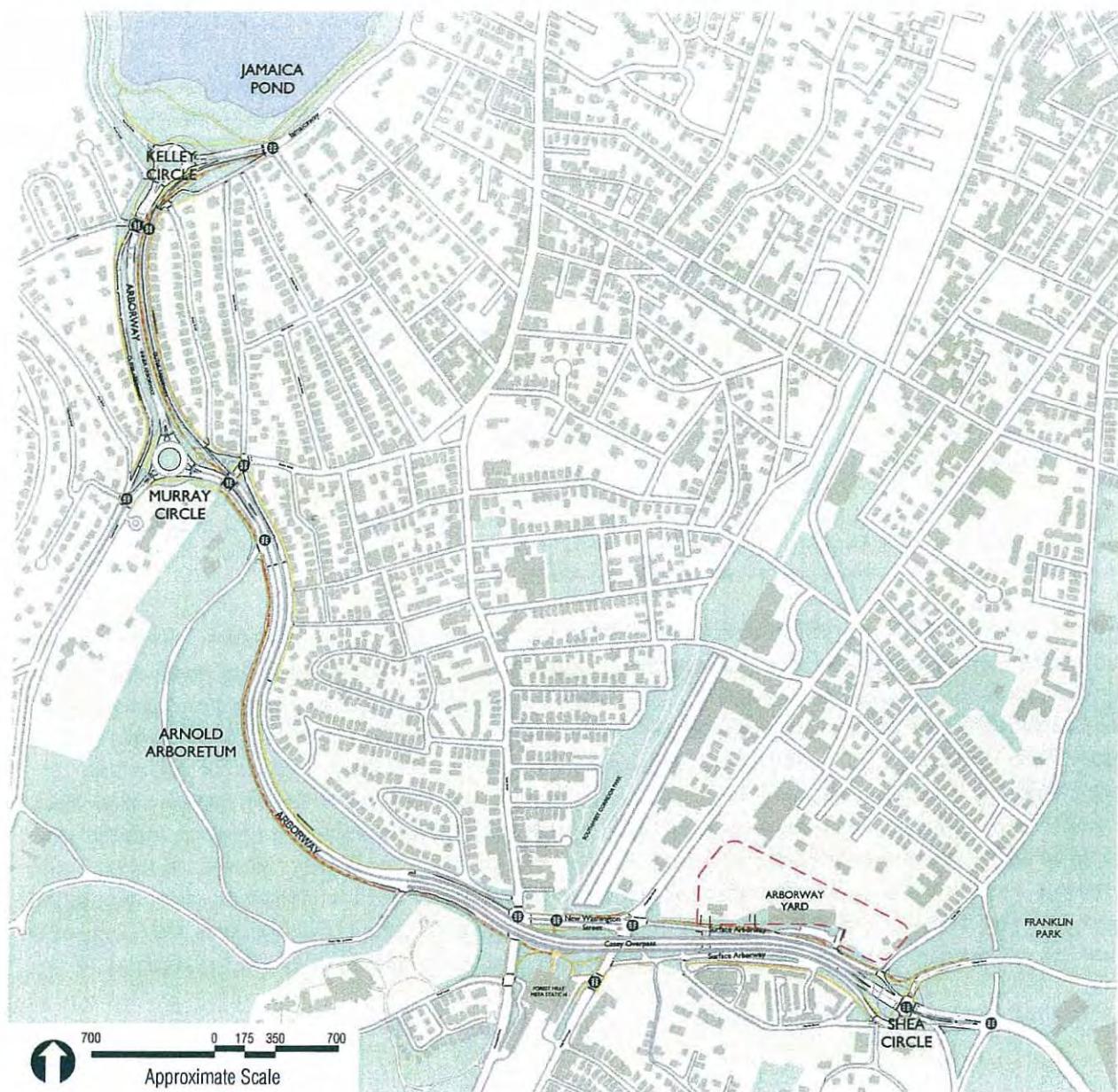
The Arborway Master Plan evaluated the advantages and disadvantages of the alternatives, and identified the improvements in each section of the Arborway that best satisfied the study's goals and objectives. Once the most beneficial alternative was identified, its disadvantages were reviewed along with the advantages of the rejected alternatives. In addition, the entire Arborway corridor was reviewed again to identify any other desirable improvements.

The Arborway Master Plan entailed a comprehensive public review process. A total of five public meetings were held for master plan, beginning in April 2002 and concluding in June 2003. Existing conditions review, alternatives analysis, and the Preferred Alternative have been posted on the Internet so that community residents and other stakeholders would be able to review the master plan's analysis and recommendations. Public input and feedback has been actively solicited. Comments and suggestions from neighborhood residents, other community stakeholders, and public agency representatives were reviewed and incorporated.

The end result of this extensive review is the Arborway Master Plan Preferred Alternative. The Preferred Alternative does not represent the unanimous choice of all study participants. Instead, it is the alternative that the Rizzo Team, with the consultation of the Boston Parks and Recreation Department and the Arborway Master Plan Working Group, has identified as best satisfying the goals, objectives, and constraints of the Arborway Master Plan. Even with the selection of the Preferred Alternative, the final report identifies a number of outstanding issues, including changes to vehicular access to and from local neighborhood streets.

**The Arborway Master Plan Preferred Alternative restores significant elements of lost Olmsted landscape by converting pavement to green space and planting appropriate trees and vegetation. The Preferred Alternative improves access for pedestrians, bicyclists, and park users by creating a clearly-marked continuous path along the Arborway, narrowing crosswalks, and providing signal-protection for every major crossing along the path. In order to achieve these landscape and pedestrian / bicycle improvements, the Preferred Alternative narrows roadways, consolidates roadways that are currently separated, reduces paved areas, and controls roadway access. By allocating pavement and traffic flows as efficiently as possible, the Preferred Alternative provides adequate vehicular access, with minor impacts to traffic operations and moderate impacts to existing traffic patterns.**

The Preferred Alternative is shown in Figure 3.



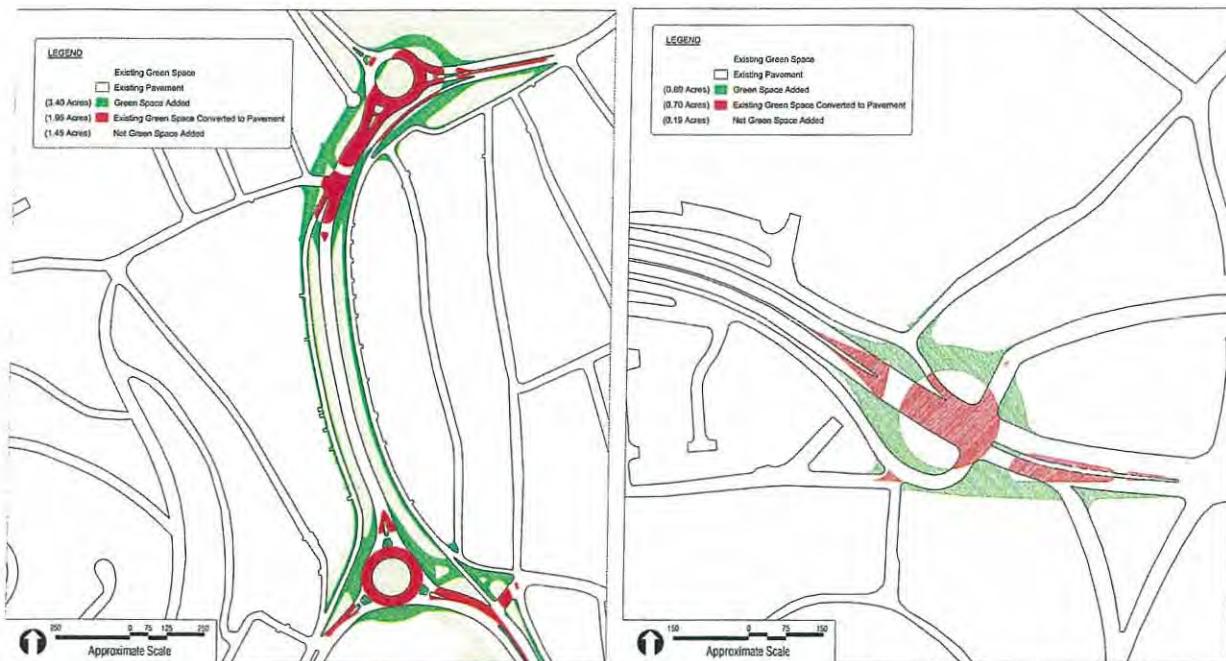
**Figure 3 Arborway Master Plan Preferred Alternative**

#### Corridor-Wide Features of the Preferred Alternative

##### Landscape Enhancements

- The overall paved area is reduced and landscaped area is increased.
- Plantings appropriate to the original Olmsted design area increased, especially red oak trees in rows lining the roadways. These new plantings are facilitated by removing and replacing dead trees and trees in poor health, filling gaps in the tree rows, and extending the tree rows into newly-landscaped areas.
- Street furnishings are replaced with furnishings appropriate to the Arborway character.

The major reductions in pavement and additions of green space are shown in Figure 4. The Preferred Alternative produces a net gain of 1.64 acres of green space.



**Figure 4 Proposed Changes to Green Space and Paved Area – Kelley Circle – Murray Circle (left) and Shea Circle (right)**

### Bicycle and Pedestrian Improvements

- A continuous, off-street shared-use bicycle / pedestrian path extends the length of the Arborway, connecting Jamaica Pond, Arnold Arboretum, and Franklin Park. All major roadway crossings along the shared-use path are protected by traffic signals.
- In addition to the shared-use bicycle / pedestrian path, new sidewalks have been added throughout the Arborway to make the pedestrian network more robust and interconnected.
- Pedestrian crossings throughout the Arborway have been improved by improving the signal protection and/or narrowing the crossing width.

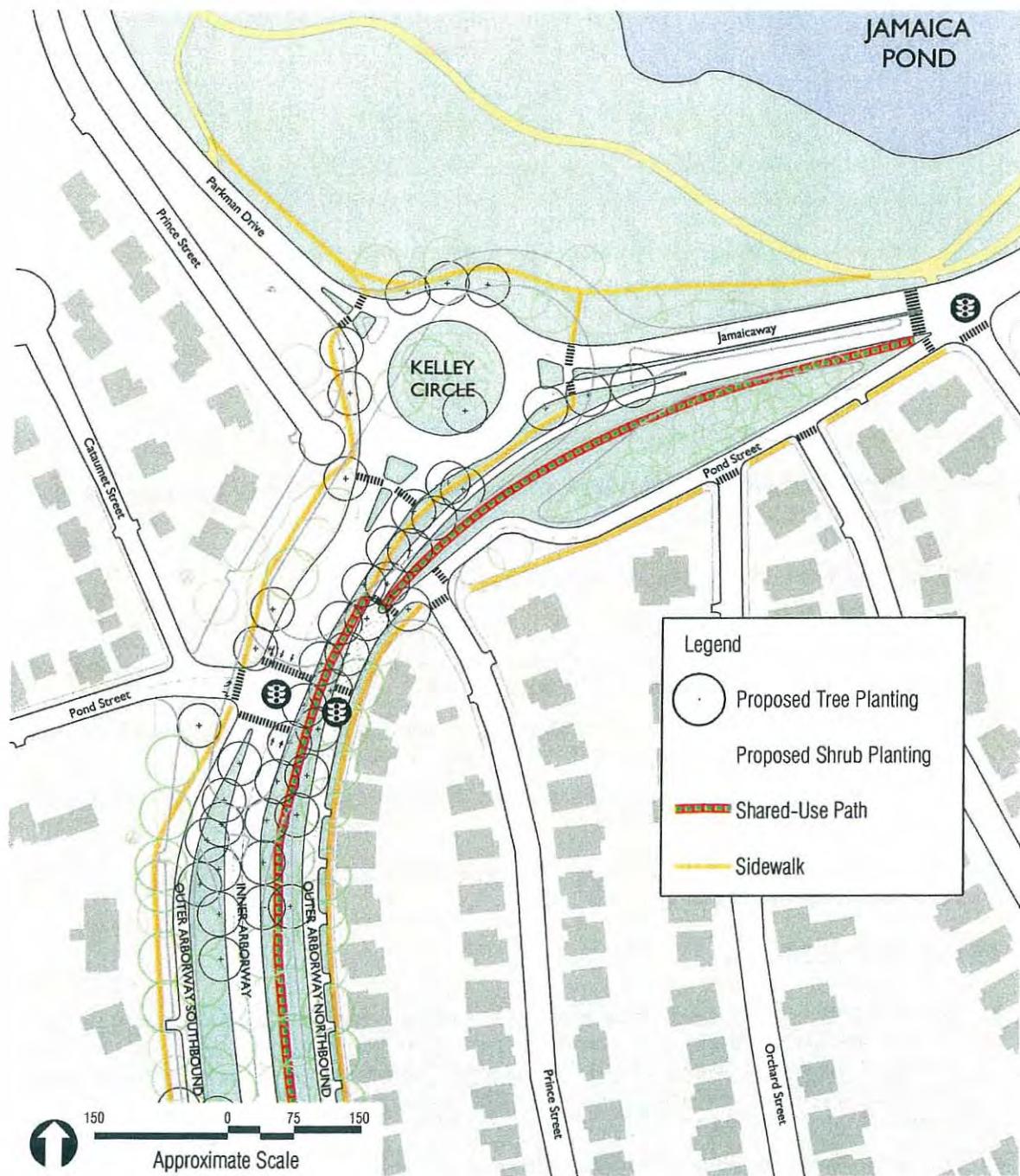
The continuous, off-street shared-use bicycle / pedestrian path is shown in Figure 3. The signal-protected crossings are highlighted.

### Motor Vehicle Traffic

- Overall roadway area has been reduced, but the roadway design, traffic access control, and traffic controls have been designed to accommodate the major traffic flows. As a result, the overall traffic operations in the Arborway corridor are generally maintained, with some traffic movements experiencing slightly less congestion and some traffic movements experiencing slightly more congestion.
- Replacing some paved areas with landscaping helps to better control traffic access and traffic flows in the Preferred Alternative. This is especially important in the section of the Arborway between Kelley Circle and Murray Circle, where access controls help to enhance the landscape, reduce the paved area,

direct motor vehicle traffic away from the residences and toward the Inner Arborway, and facilitate improved pedestrian and bicycle crossings.

The Arborway is a linear park that must be thought of as a cohesive corridor. However, the different sections of the Arborway also have specific issues, and different improvements and treatments are appropriate for these sections. Therefore, the Preferred Alternative recommendations are described below for each section of the Arborway, beginning at Kelley Circle near Jamaica Pond, and progressing south to Shea Circle near Franklin Park.



**Figure 5 Preferred Alternative – Kelley Circle**

## Preferred Alternative – Kelley Circle Area

- **Historic Landscape.** Green space is added and plantings appropriate to the Arborway's historic character are added to existing and new green spaces along the Arborway.
- **Pedestrian and Bicycle.** The continuous shared-use bicycle / pedestrian path connects from the eastern median between the Inner Arborway and the Outer Arborway Northbound, to the landscaped area between Kelley Circle and Pond Street, to Jamaica Pond. All crossings on the shared-use path are signal-protected.
- **Motor Vehicle.** The existing large, oblong rotary at Kelley Circle is replaced with a smaller “modern roundabout.” The Outer Arborway roadways are both narrowed to a single lane, and access is limited. Roadways are narrowed, pavement is eliminated, and roadway alignment is improved.

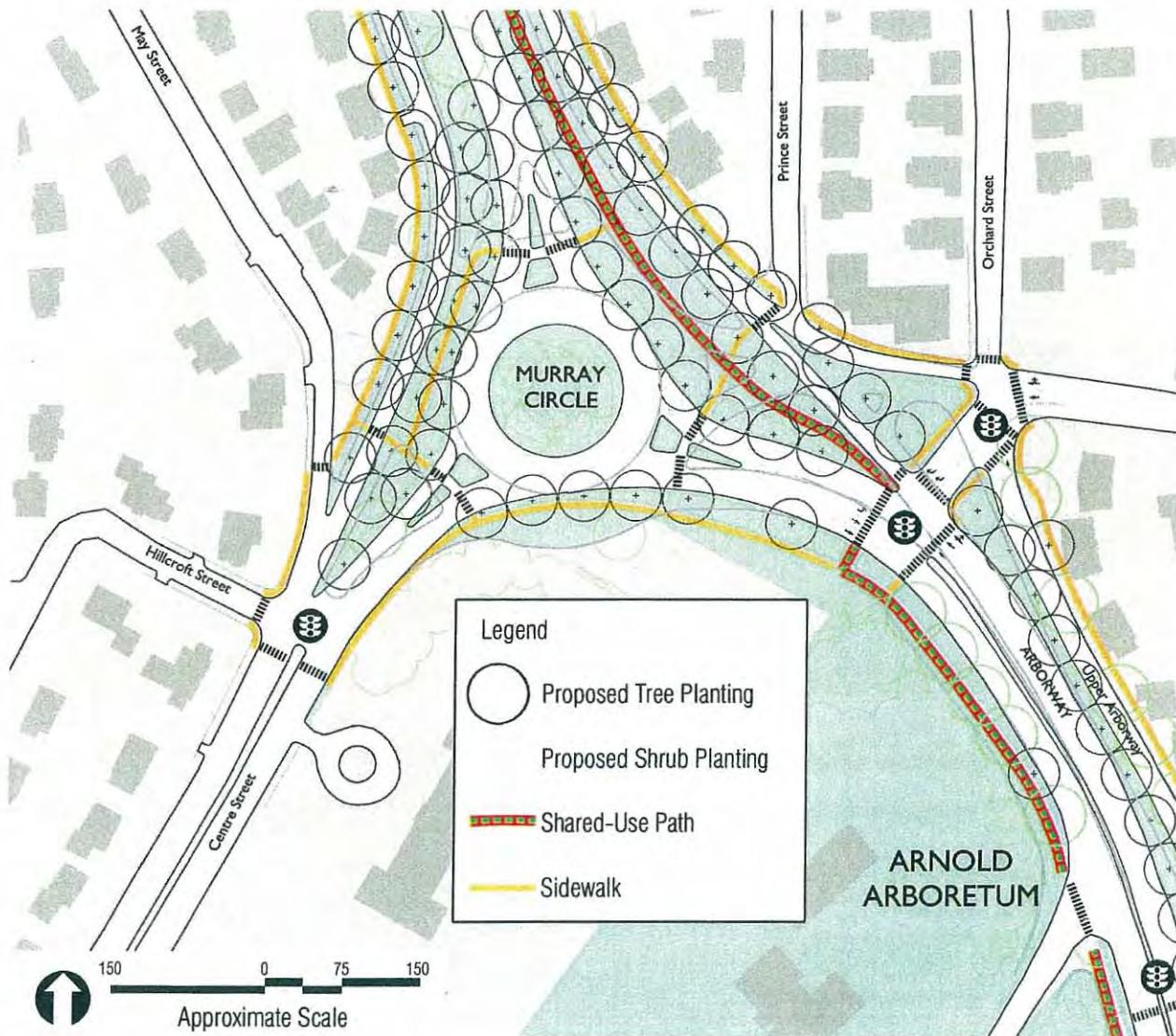
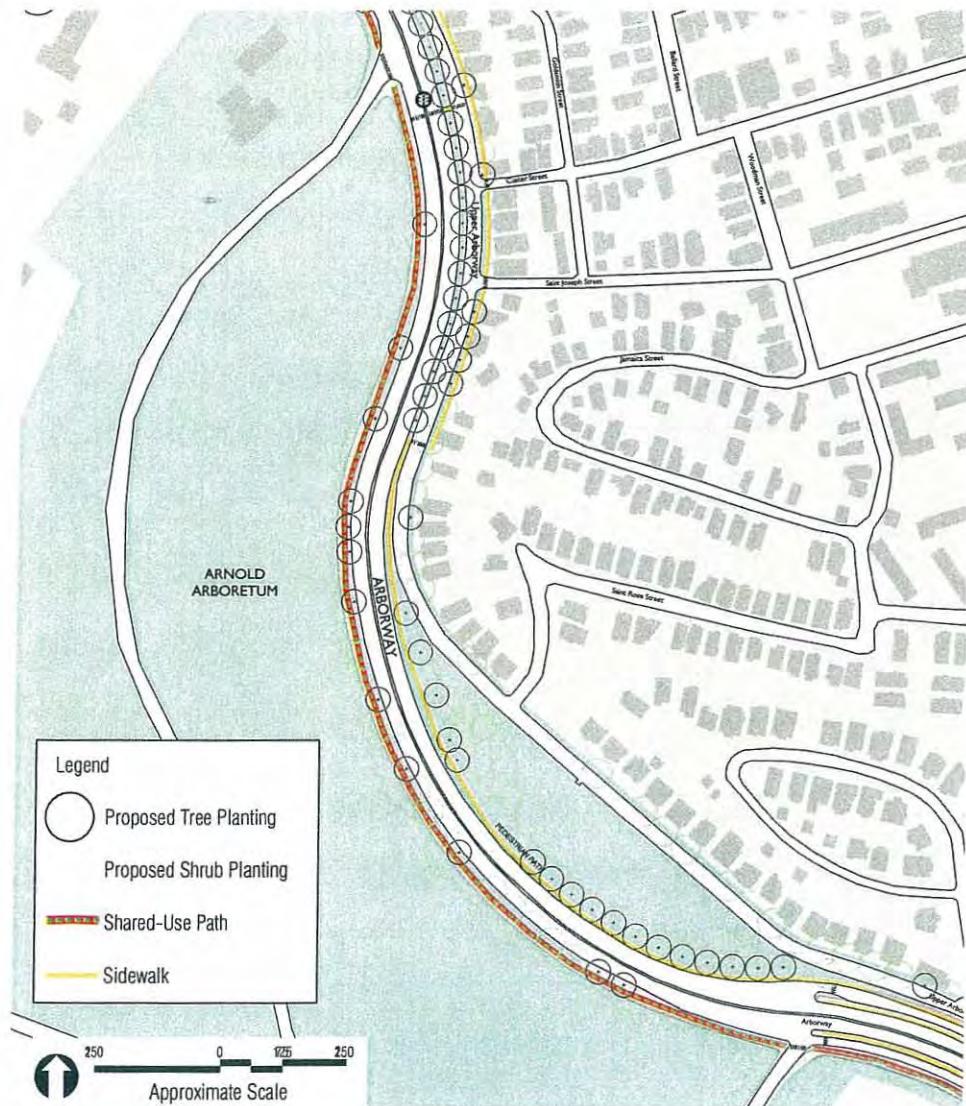


Figure 6 Preferred Alternative – Murray Circle

### Preferred Alternative – Murray Circle Area

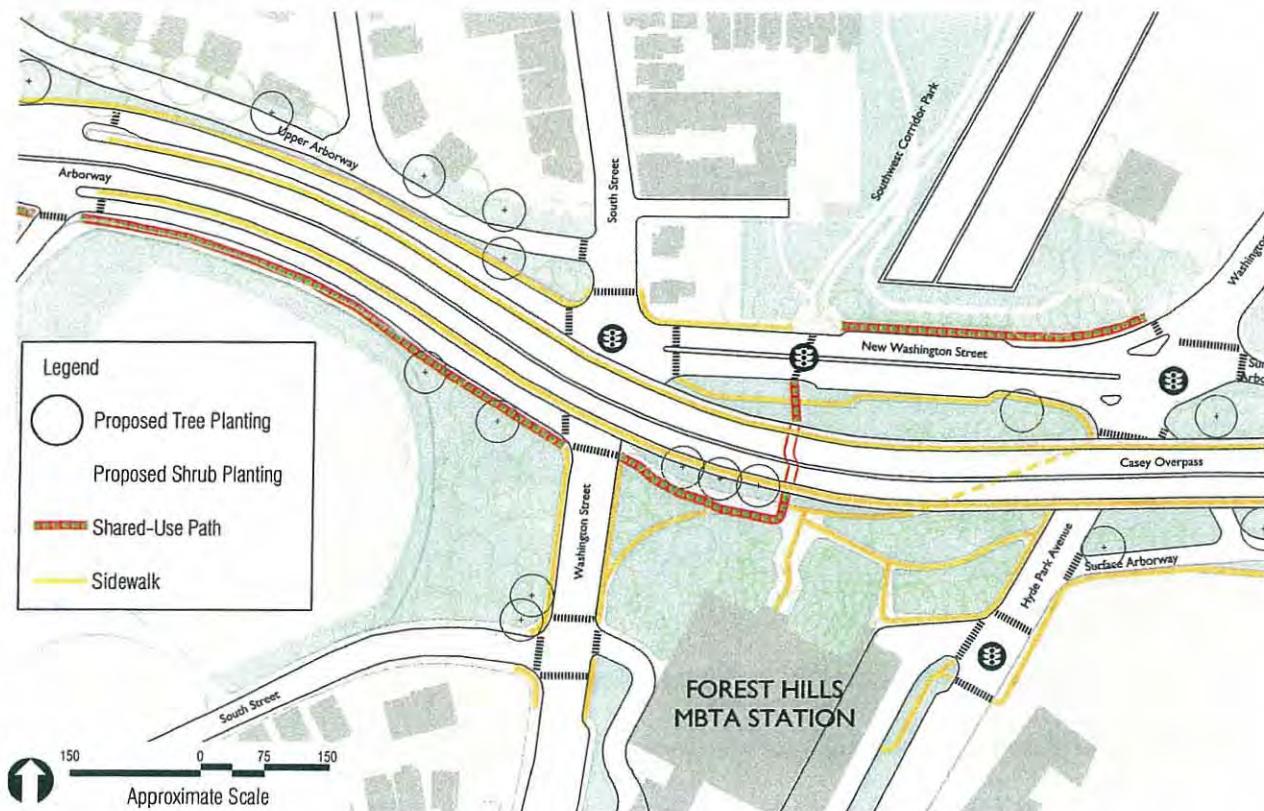
- **Historic Landscape.** Landscaped area is added and plantings appropriate to the Arborway's historic character are added to existing and new green spaces along the Arborway.
- **Pedestrian and Bicycle.** The continuous shared-use bicycle / pedestrian path connects from the western edge of the Arborway, adjacent to the Arboretum, to the eastern median between the Inner Arborway and the Outer Arborway Northbound. All crossings on the shared-use path are signal-protected.
- **Motor Vehicle.** The existing large rotary at Murray Circle is replaced with a smaller “modern roundabout.” Rotary entries are consolidated and rationalized. Roadways are narrowed, pavement is eliminated, and roadway alignment is improved.



**Figure 7 Preferred Alternative – Arborway Adjacent to the Arnold Arboretum**

### Preferred Alternative – Arnold Arboretum Area

- **Historic Landscape.** No new landscaped areas are added in this section of the Arborway, but historic plantings are restored along the western edge of the Arborway and in the median between the Arborway mainline and the Upper Arborway.
- **Pedestrian and Bicycle.** The Arborway pedestrian crossing at the Arnold Arboretum's main Hunnewell Gate is improved. The continuous shared-use bicycle / pedestrian path is provided along the western edge of the Arborway, between the row of red oak trees and the Arboretum wall. A continuous sidewalk is provided along the eastern edge of the Arborway / Upper Arborway corridor.
- **Motor Vehicle.** The roadway and motor vehicle traffic operations are not changed significantly in this section of the Arborway.

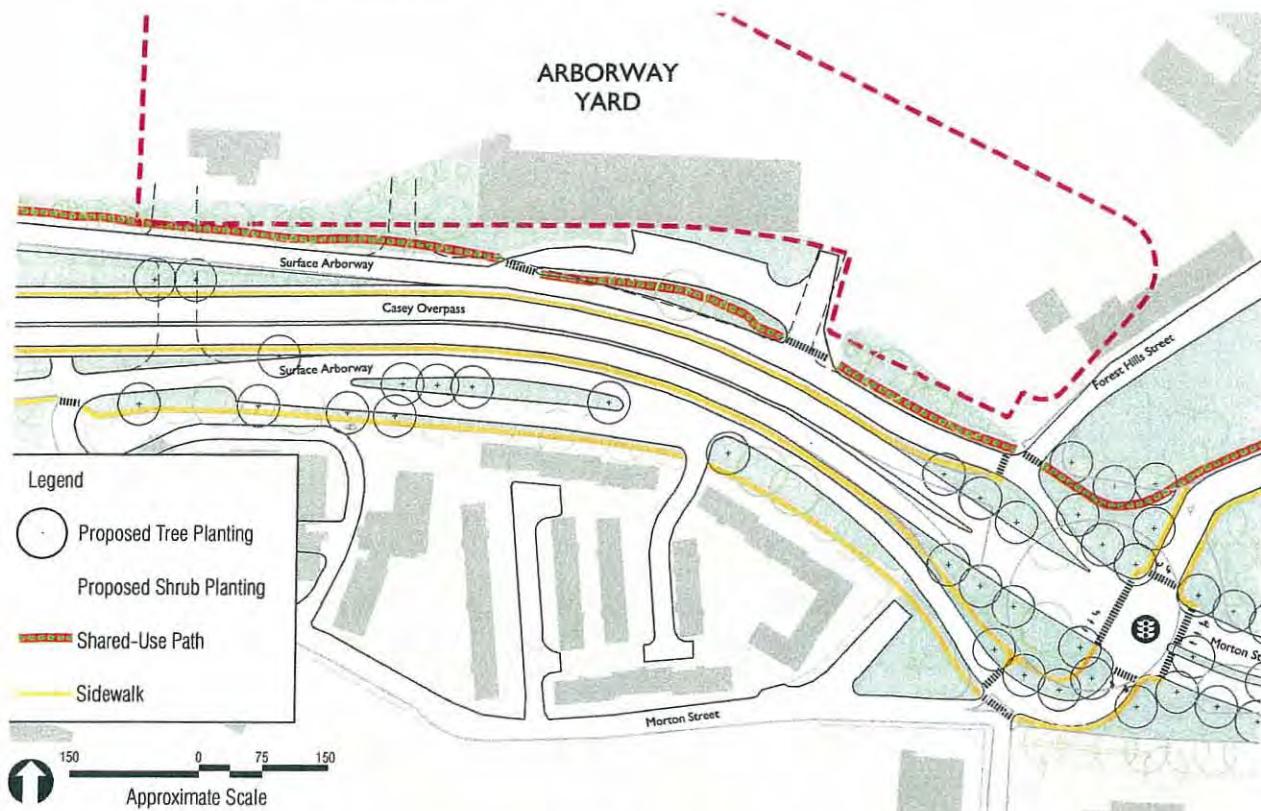


**Figure 8 Preferred Alternative – Forest Hills**

#### Preferred Alternative – Forest Hills Area

- **Historic Landscape.** The construction of the Casey Overpass eliminated much of the original historic landscape in the Forest Hills section of the corridor. Elimination of the Casey Overpass was reviewed, but was rejected as infeasible due the high traffic volumes in the corridor and the presence of the surface streets and the depressed rail lines. Historic plantings are restored where possible, principally in the green space around the Casey Overpass. In addition, the aesthetic treatment of the Casey Overpass itself should be improved with more attractive lighting and other fixtures.
- **Pedestrian and Bicycle.** The pedestrian and bicycle connections in the Forest Hills section of the Arborway are improved by widening them, enhancing the materials used, and increasing the visibility of these connections. The Arborway ramps to and from South Street are narrowed to provide additional width for pedestrians and bicycles. The continuous shared-use bicycle / pedestrian path continues through this segment of the Arborway, with clearly marked connections and signal-protected crossings.

- **Motor Vehicle.** The potential changes to the roadways in the Forest Hills section of the Arborway are constrained by heavy traffic volumes, access requirements for the MBTA's Forest Hills Station and Arborway Yard facility, and the presence of the Casey Overpass. As a result, major changes to the roadways are not recommended.

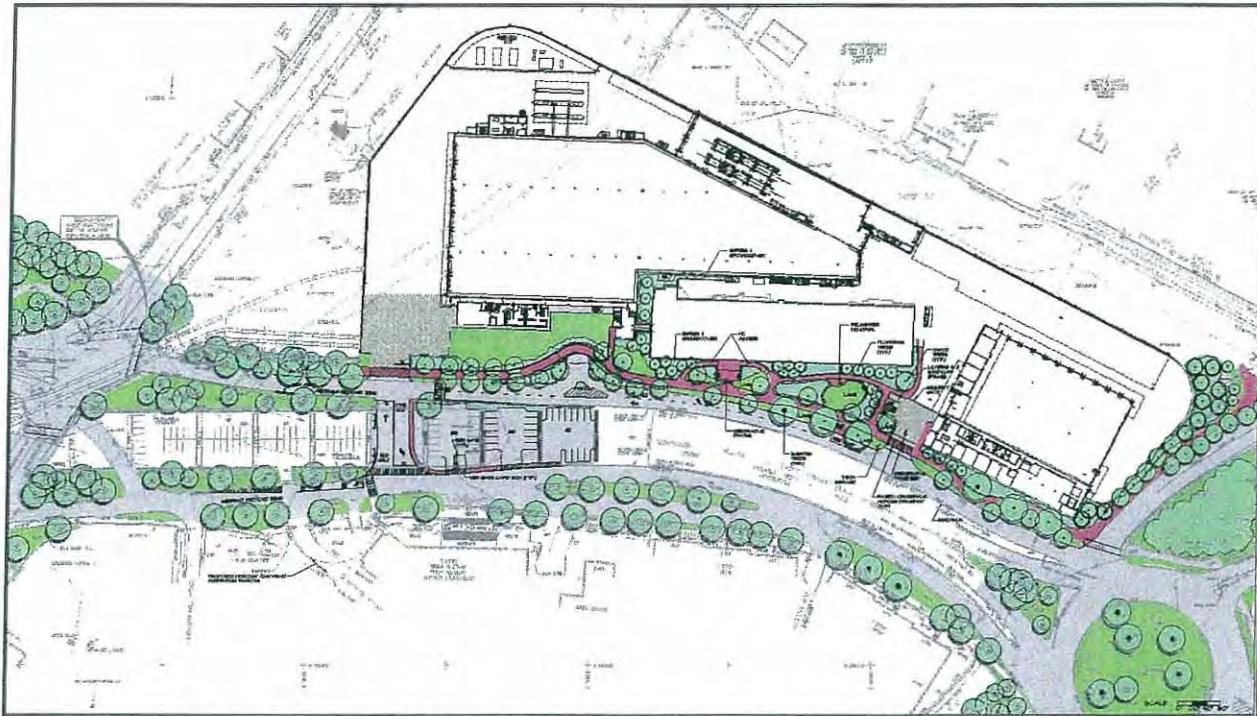


**Figure 9 Preferred Alternative – Shea Circle**

#### Preferred Alternative – Shea Circle Area

- **Historic Landscape.** The large rotary at Shea Circle is eliminated, which enables the restoration of a significant amount of the historic landscape with appropriate plantings and enables the restoration of a gateway for Franklin Park.
- **Pedestrian and Bicycle.** The elimination of the rotary provides signal-protected crossings for pedestrians and bicycles traveling to and from Franklin Park. The shared-use bicycle / pedestrian path runs along the northern edge of the Surface Arborway westbound, between the roadway and the 500 Arborway / Arborway Yard MBTA facility.
- **Motor Vehicle.** The large rotary at Shea Circle is replaced with a four-way signalized intersection, formed by Casey Overpass / Morton Street / Circuit Drive / Surface Arborway Eastbound.

The Preferred Alternative at Shea Circle is consistent with the MBTA's ongoing planning and design for the 500 Arborway / Arborway Yard site. The most up-to-date draft plan for the facility is shown in Figure 11.



**Figure 10 500 Arborway / Arborway Yard Site**

### **Treatment of the Casey Overpass**

The Rizzo Team thoroughly studied several options related to the Casey Overpass including removal, replacement with a depressed tunnel, and reconstruction of the overpass with a smaller structure. While removal of the Casey Overpass is desirable to re-establish the historic character of the Arborway, this option would cause unacceptably adverse effects to traffic flow, neighborhood character, and the Forest Hills MBTA station. Therefore, wholesale removal or change to the Casey Overpass was not included in the Preferred Alternative.

### **Short-Term Implementation of the Preferred Alternative**

The Arborway Master Plan Preferred Alternative includes significant changes to the Arborway's roadways, landscape, and traffic flows. These changes will require a major financial investment, estimated at approximately \$17.7 million for all of the landscape, pedestrian and bicycle, roadway, and traffic signal improvements. The Preferred Alternative will also take many years to complete the consensus-building, environmental permitting, design, and roadway construction. Therefore, the Preferred Alternative is a long-term recommendation.

There are many elements of the Preferred Alternative that can be implemented in the short-term, without significant roadway changes.

The Arborway Master Plan's short-term landscape recommendations include:

- Removing and replacing dead trees and trees in poor health.
- Filling gaps in the existing rows of red oaks lining the roadways.
- Restoring the row of red oaks between the Arborway mainline and the Upper Arborway.

Short-term recommendations also include improvements to pedestrian and bicycle access:

- A new signalized pedestrian crossing at Jamaicaway / Eliot Street
- Tighter corner radii and shorter crossings at the Parkman Drive approach to Kelley Circle
- Improved markings and visibility for the pedestrian crossings at the Arboretum's main Hunnewell Gate
- Reconstruction of the sidewalk along the edge of the Arboretum to create a segment of the shared-use bicycle / pedestrian path
- Improved signage to guide pedestrians and bicycles through the Forest Hills area to and from Franklin Park.

The short-term recommendations also include rebuilding the Arborway's southbound approach from Kelley Circle at Pond Street so that traffic is oriented more directly toward the Inner Arborway rather than the Outer Arborway Southbound.

The Preferred Alternative has raised a number of issues that cannot be addressed with the available data and within the constraints of this study, but which must be dealt with through planning, design and implementation stages for the Arborway. These issues include detailed impacts for local access and circulation, traffic signal warrant analyses for proposed new traffic signals, and impacts to water mains beneath the Arborway.

## 1.0 Introduction

The Arborway Master Plan is a vision for the Arborway that is designed to enhance the character of both the historic landscape and the linear park, and to improve access for pedestrians and bicyclists. In order to achieve this, the Master Plan describes the historic development of the Arborway, its extant historic features, and current transportation conditions for motor vehicles as well as for pedestrians and bicyclists. The Arborway Master Plan assesses these conditions to identify issues and opportunities related to improving the Arborway's historic landscape and transportation character. Based on these issues and opportunities, the Arborway Master Plan proposes a range of potential historic preservation opportunities and alternatives for transportation improvements, and evaluates the benefits and costs of these proposals. Finally, the Arborway Master Plan includes a set of recommendations that achieve the study's goals and objectives, are based on sound technical analysis, and are responsive to public agency and community comments.

## 1.1 Study Area

The Arborway Master Plan study area consists principally of the 1.5 mile long Arborway between the Jamaicaway and Morton Street, the Arborway's principal intersections, the green spaces along the parkway's length, and the connections to the adjacent park spaces: Jamaica Pond, the Arnold Arboretum, and Franklin Park. Figure 1-1 shows the study area.

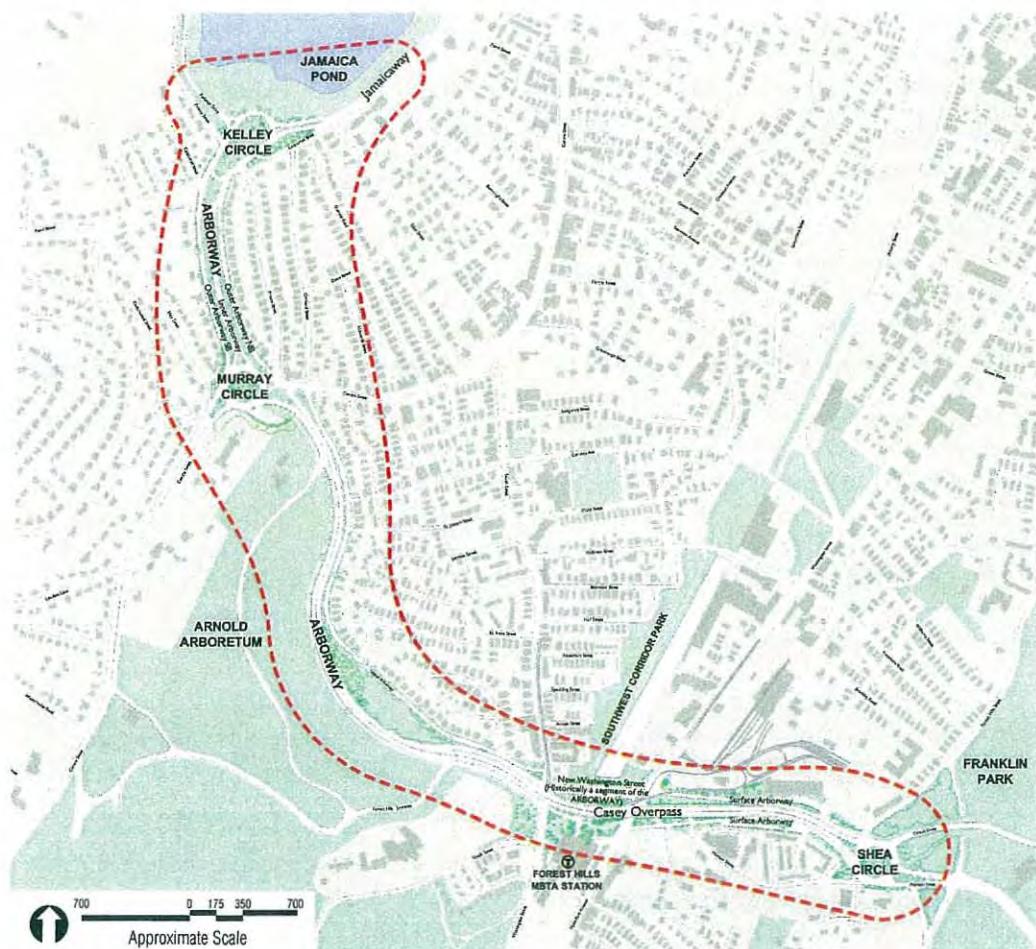


Figure 1-1 – Arborway Master Plan Study Area

## **1.2 Study Needs**

The Arborway is a segment of Boston's Emerald Necklace park system. At its northern end, the Arborway connects to the Jamaicaway at Kelley Circle adjacent to Jamaica Pond, and extends approximately 1.5 miles southeast to Shea Circle, adjacent to Franklin Park.

As part of the Emerald Necklace parkway system, the Arborway has many roles to play:

1. Historic landscape
2. Connection for park users between Franklin Park, Arnold Arboretum, and Jamaica Pond
3. Bicycle and pedestrian through-connection along the Emerald Necklace
4. Open space resource for nearby residents and visitors
5. Local street
6. Regional motor vehicle route

These roles demand that the Arborway function as a multi-modal transportation corridor as well as an inviting, historical landscape in its own right. The Arborway was designed by Frederick Law Olmsted, Sr., and it still retains much of its historic character, with distinctive rows of mature red oak trees lining the roadways.

The Arborway is also an important open space for pedestrians and bicyclists, both from the immediately surrounding neighborhoods and from the entire Boston region. The Arborway serves as a linear park, as well as a connection to three of Boston's largest and most heavily used open spaces, Jamaica Pond, the Arnold Arboretum, and Franklin Park. However, the Arborway's function as a regional vehicular through-way threatens to overwhelm its other functions and its character. The Arborway's location adjacent to these three parks is essential to its original design, but coincidental to the vehicular through-connections that the Arborway provides to most traffic.

The Emerald Necklace was designed as linear park, and the parkways running through it were not intended as major vehicular routes. However, the parkways of the Emerald Necklace have become a major traffic route for several reasons. Because it was designed as a linear park, the Emerald Necklace has a wide, continuous right-of-way that is impeded by relatively few cross-streets. The Emerald Necklace also connects to downtown Boston at its northern end, and runs through a number of densely populated neighborhoods. Finally, the historic decision to cancel construction of the Southwest Expressway perpetuated the lack of a radial highway connection between downtown Boston and points to the southwest. As a result, the parkways of the Emerald Necklace are heavily traveled by motor vehicles because they provide the quickest and most convenient vehicular connections for Jamaica Plain, Roslindale, West Roxbury, Brookline, the Fenway, the Longwood area, Dorchester, and other areas to the southwest of downtown.

Heavy through-traffic has caused the Arborway to lose its relationship to the adjacent open spaces, and it is no longer an integral part of the park experience. Drivers traveling at high speeds along the Arborway are unable to fully appreciate the parkway's beauty. Speeding vehicles and roadway obstacles impede pedestrians and bicyclists from traversing the Arborway and from crossing the Arborway to reach the parks.

The Arborway Master Plan reviews the parkway's historic background and its extant historic resources, assesses its existing transportation conditions, identifies opportunities to restore the Arborway's historic integrity and multi-modal transportation character, and recommends approaches for improving the Arborway's historic resources and access for pedestrians and bicyclists.

## **1.3 Study Goals and Objectives**

The vision of the Arborway Master Plan is of a parkway that retains its historic character, takes advantage of its proximity to major open spaces and to surrounding residential neighborhoods, and functions as a safe and convenient multi-modal transportation corridor.

The Arborway Master Plan was undertaken with the following goals:

- To rehabilitate historic landscape where it still exists or to replace, to the extent possible, Frederick Law Olmsted's original design where the landscape has been compromised or altered;
- To strengthen the historic parkway experience; and
- To re-establish the function of the Arborway as an unbroken, shared-use connector between the three parks (Franklin Park, Arnold Arboretum and Jamaica Pond), providing safe, convenient access for pedestrians, bicyclists, and other park visitors.

In order to achieve these goals, the following specific objectives have been identified:

- Protect and enhance the historic landscape.
  - Preserve extant historic resources
  - Restore lost historic landscape elements
  - Enhance the usable park space of the Arborway
- Enhance pedestrian and bicycle connections throughout the Arborway.
  - Create a continuous off-street path for pedestrians and bicycles
  - Provide improved connectivity of sidewalks along the Arborway
  - Provide safe, comfortable crossings of the Arborway at key intersections and desire lines
- Provide safe and appropriate motor vehicle access and mobility.
  - Provide clear, intuitive vehicular connections
  - Allocate pavement efficiently
  - Better organize traffic flows and vehicular connections
  - Direct a higher proportion of traffic toward Inner Arborway in the segment between Kelley Circle and Murray Circle
  - Accommodate existing traffic demand, and future traffic increments due to general background increases

## 1.4 Project Methodology

The Arborway Master Plan was undertaken with the understanding that three principal elements would have to be balanced: the landscape, pedestrian and bicycle access, and motor vehicle traffic. This balance must be achieved in the context of the Arborway's background and current status: that much of the Arborway's original historic landscape and utility for non-motorized users have been lost due to changes that solely benefit automobile access. Therefore, the Arborway Master Plan is designed to provide the greatest benefits to historic authenticity, landscape character, and pedestrian / bicycle access that are possible without creating unacceptable traffic congestion.

The Arborway Master Plan's methodology reflects these priorities. The following is a description of the study methodology, and the major steps in the study process.

1. **Historic Background and Landscape Treatment Potential.** The methodology used to develop this report follows the National Park Service's standards and guidelines, which define the preservation approaches for historic properties and provide general guidance for acceptable treatment work. The NPS [Guide to Cultural Landscape Reports](#) and [National Register Bulletins](#) provide methodologies for researching, documenting and analyzing cultural landscapes. This includes site history research, inventory of existing conditions, and the evaluation of integrity and significance. The principles for physical work are defined within [The Secretary of the Interior's Standards for the Treatment of Historic Properties](#) (Secretary's Standards) and the [Guidelines for](#)

the Treatment of Cultural Landscapes. These standards are currently used nationally for historic properties eligible or listed on the National Register of Historic Places, whether they are in public or private ownership.

Following the NPS methodologies, the inventory, analysis, and treatment of the Arborway landscape includes several components:

- An historical overview which documents the chronological development of the Arborway, contributing to an overall understanding of the property;
- The historic context narrative and the definition of the period(s) of significance provide a framework for understanding the historic character and significance of the entire property, as well as its individual features;
- The inventory of existing conditions documents extant features, necessary to understand the overall condition of the property and its individual features;
- The evaluation of integrity compares the historic appearance of the property to its current condition, necessary to understand the cumulative changes, additions, and losses over time, and to document which existing features remain from the period of significance.

The analysis of historical and existing conditions identifies the character-defining features that are extant from the period of significance as well as missing historic features, which is necessary to determine both the integrity and significance of the property. The treatment recommendations follow the Secretary's Standards and the NPS Guidelines for the Treatment of Cultural Landscapes in order to preserve and protect the integrity of the historic property as well as respect its current use.

**2. Pedestrian and Bicycle Challenges and Opportunities.** The changes to the Arborway's original design have not only diminished the historic landscape, but they have also created significant obstacle for pedestrian and bicycle access in the corridor. To address this issue, the study process employed:

- Field reconnaissance and inventory of existing pedestrian and bicycle conditions;
- Detailed counts of pedestrian and bicycle routes and volumes; and
- Stated preference surveys of pedestrian and bicycle behavior and perceptions.

Using these findings, the Arborway Master Plan identified the most important problems, issues, and desires of pedestrians and bicycles in the Arborway corridor.

**3. Motor Vehicle Demand and Traffic Operations.** As they were intended to do, the changes to the Arborway corridor have enabled high volumes of motor vehicle traffic to traverse the Arborway at high speeds. Whether or not this was appropriate or desirable, the Arborway Master Plan accepted that the current level of motor vehicle traffic must be accommodated in a reasonable manner, and not diverted to other roadways. The Rizzo Team completed a comprehensive motor vehicle traffic evaluation so that the Arborway Master Plan could adequately and appropriately address the motor vehicle traffic demands and the impacts of proposed improvements on traffic operations. This evaluation included:

- Field reconnaissance and inventory of roadway conditions, roadway design and dimensions, traffic flow characteristics, and traffic control devices;
- Traffic volumes counts, including counts of daily traffic and counts of traffic during the morning and afternoon commuter peak periods;
- Computer analysis and simulation of traffic operations; and
- Review of motor vehicle crash records and identification of locations with high crash rates.

**4. Corridor Improvement Alternatives Analysis.** In order to develop and evaluate alternatives for improvements to the Arborway, the three components of the study, historic landscape, pedestrian and bicycle

access, and motor vehicle traffic, were integrated and balanced against each other. The alternatives analysis process followed these basic steps:

- Identification of areas with extant historic landscape (for preservation);
- Identification of areas with lost historic landscape (for potential restoration or rehabilitation);
- Identification of important pedestrian and bicycle paths, crossings, and connections, whether currently satisfactory or problematic;
- Proposal of corridor designs that preserve the extant historic landscape, restore lost historic landscape (where possible), provide attractive and safe pedestrian / bicycle access throughout the Arborway corridor; and continue to provide connectivity for motor vehicle traffic;
- Analysis of motor vehicle traffic impacts of the corridor design alternatives;
- Iterative redesign of the proposed alternatives in order to address problems and trade-offs associated with the Arborway Master Plan goals and objectives; and
- Assessment of the degree to which the proposed alternatives satisfy the Arborway Master Plan’s goals and objectives with respect to preserving and restoring the historic landscape, improving pedestrian and bicycle access, and providing adequate motor vehicle traffic access and operations.

5. **Selection of a Preferred Alternative.** Based on the results of the alternatives analysis, the proposed alternative that best satisfied the Arborway Master Plan’s goals and objectives was selected as the Preferred Alternative. The advantages and disadvantages of the Preferred Alternative were described, and anticipated costs were identified.



## 2.0 Historic Overview

### 2.1 Introduction

In order to ensure that the historic character of the Arborway is both understood and retained, the following historic overview has been prepared to document the chronological development of the parkway and identify its character-defining features. To accomplish this, the first tasks are the assembly of the site chronology and the identification of the periods of parkway development, which reveal the historic appearance and components of the parkway during discrete time periods.

The relevant dates and periods documented are:

1859 – 1877	Early Park Period
1879 – 1897	Frederick Law Olmsted, Sr. Period
1898 – 1949	Transition to Automobile Use
1950 – Present	Urban Roadway Period

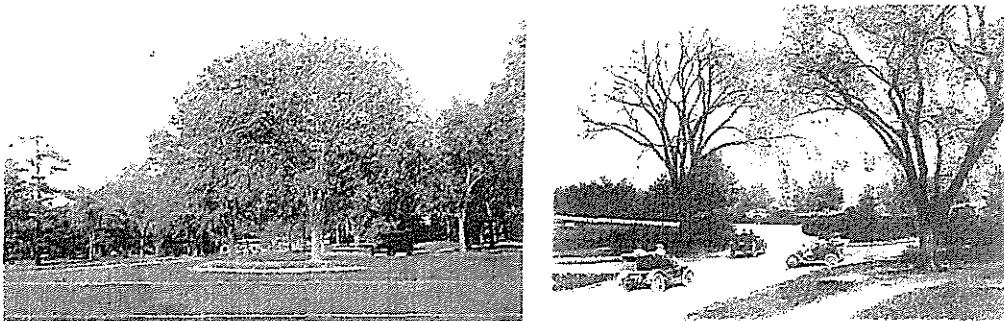
The report documents as completely as possible these periods of the landscape history. As in all historic research, future findings may further illuminate the historic record and alter the interpretation of a particular period. This report is, therefore, a working document that presents the current understanding of the Arborway and its history.

The chronological site history was developed in conformance with the standards as defined by the NPS Cultural Resource Management Guidelines, Release No. 5 (1997). It describes the landscape through every relevant historic period until the present, and includes the development of the concept for the Emerald Necklace park system between 1859 and 1877. The site history records the physical changes, events, and persons integral to the evolution of the Arborway, evident in historic documents. Relevant documentation of the process of the design and construction of the Arborway is quoted from the city records. The Boston Parks Reports have been invaluable resources that describe many of the principles of the design and record the installation of the landscape characteristics.

The historical inventory for the Arborway included archival research on the parkway's original design and development from 1859 to the present. Original drawings and lithographic prints were reviewed as well as photographs, parks reports, and other written works for changes to the original design. There is not extensive photographic documentation for the Arborway in the Frederick Law Olmsted National Historic Site Archives and limited other photographs are available at the Society for the Preservation of New England Antiquities and Boston Public Library Print Department as well as in the Boston Parks reports. While the photo documentation does illustrate many of the landscape features, the character of the "drive" and the associated planting has better documentation than the promenade and "the ride". Photographs are also often not identified or dated (Figures 2-1a, 2-1b, 2-2a, 2-2b).



**Figure 2-1a & 2-1b** (1a) Boulevard Drives and Arborway, Forest Hills, Mass., December 11, 1913, SPNEA; (1b) Road from Franklin Park to Forest Hill, Boston, Mass., Thomson & Thomson, May 1925, SPNEA.



**Figure 2-2a & 2-2b** (2a) Parkway Showing Planting, No Date, FLONHS, # 902-88 Arnold Arboretum Series; (2b) Glimpse of Arboretum fROM Centre Street, Thomson & Thomson, No Date, SPNEA

The detailed field inspections, performed during the documentation of the existing conditions, allowed us to identify character-defining features or landscape characteristics extant from the periods of the Arborway's development.

## 2.2 Chronological Site History of the Arborway

Following is the chronological site history with an emphasis on the legislation establishing the Boston Park System, the landscape characteristics and the design concept of the Arborway as designed by Olmsted, as well as an expansion of features that relate to the original design intent and as-built condition of the Arborway. Included in this site history are earlier relevant studies and master plans that included or focused on the Arborway.

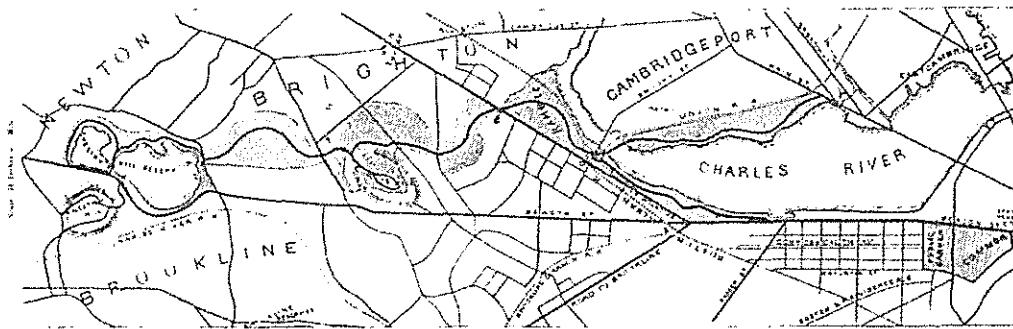
### 2.2.1 Early Park Period 1859-1877

In her book *Frederick Law Olmsted and the Boston Park System* Cynthia Zaitzevsky covers this period in Chapter III, "The Boston Park Movement." Zaitzevsky reports that Boston responded with surprising promptness to the example set by Central Park in New York, and that documents of the period clearly indicate that the improvements made to the Public Garden in 1859-1860 were intended as Boston's answer to Central Park. The Civil War, however, interrupted the park momentum and it was not until 1869 that the movement again continued in Boston.

In October 1869, a group of citizens presented a petition to the Boston City Council for a public park. As a result of the petition, the Common Council established a Joint Special Committee to report on what action the city government should take. This committee held two public meetings in November 1869 and this led Mayor Nathaniel B. Shurtleff to petition the Massachusetts General Court to pass an act authorizing the City of Boston to purchase land for one large park or several small parks.

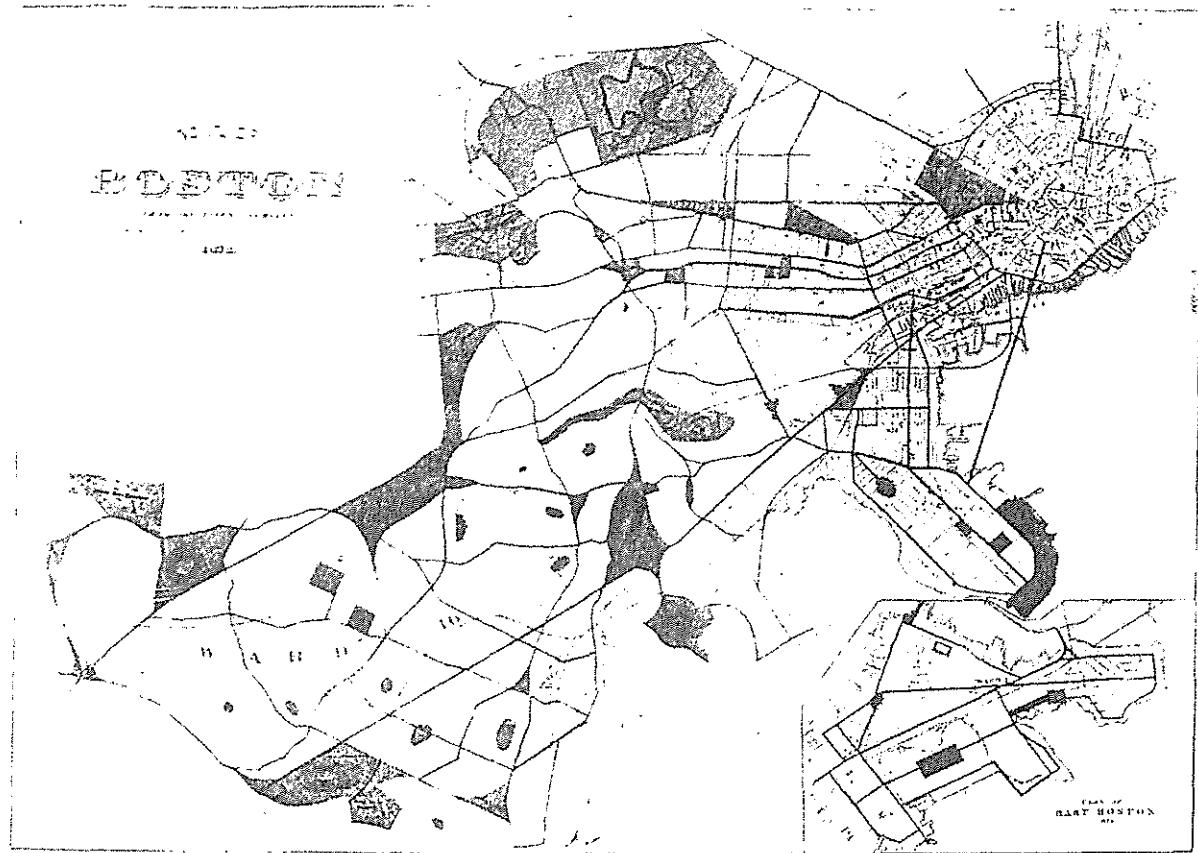
Between 1869 and 1974, Uriel Crocker, Horace W. Cleveland, and Robert Morris Copeland all prepared similar proposals to develop a linear park connecting existing natural features. The debate was whether they should be entirely within Boston or include land outside the city. Cleveland also made a point “that road improvements and drainage were of the first importance”.

Uriel Crocker's Metropolitan Park System was a linear park from the city to the county, centrally located including prominent features including a river, hill and reservoir. Crocker had sent a copy of his proposal to Frederick Law Olmsted (Figure 2-3).



**Figure 2-3    Metropolitan Park System Proposed by Uriel H. Crocker, 1869. Map Collection, Harvard College Library. (Zaitzevsky)**

Robert Morris Copeland's editorial of December 2, 1869 in the *Boston Advertiser* proposed several large parks linked by a one hundred-foot wide “boulevard” or circumferential parkway. In 1872, Copeland published a book entitled *The Most Beautiful City in America: An Essay and Plan for the Improvement of the City of Boston*. The plan from this book is Figure 2-4.

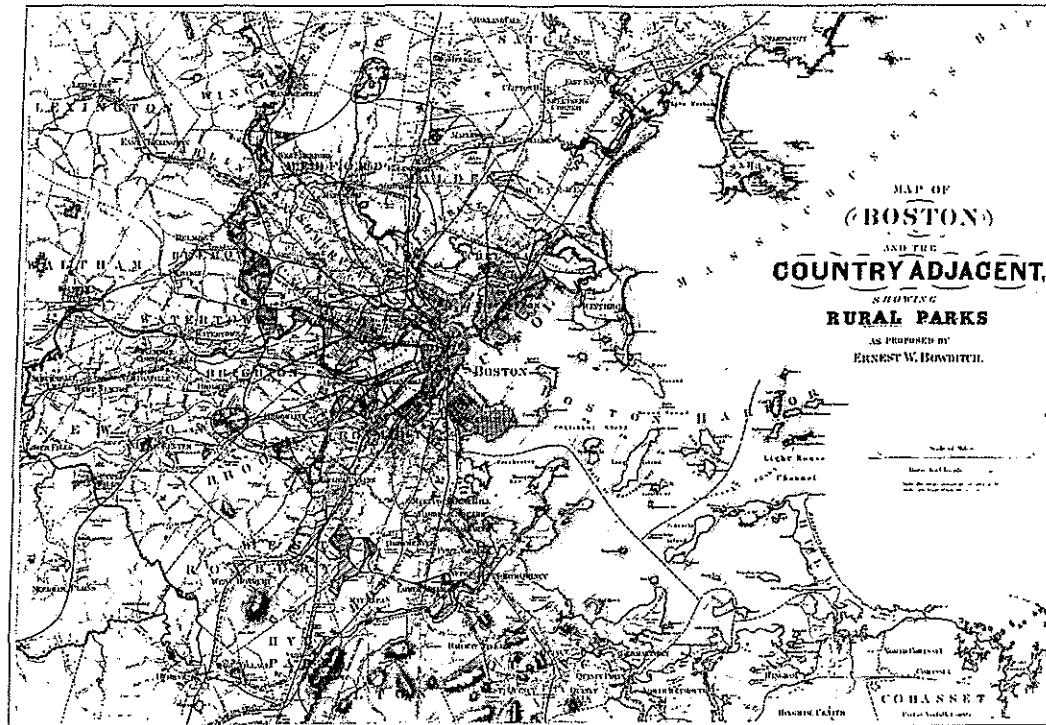


**Figure 2-4 Map of Boston, Showing Improvements in Streets and Reservations for Public Grounds Proposed by Robert Morris Copeland, 1872. Map Collection, Harvard College Library. (Zaitzevsky)**

It however was not until early in 1874 that Mayor Samuel Cobb set up a special commission to study the whole question of parks and to review park proposals. Uriel Crocker presented a variation of his earlier plan and Ernest W. Bowditch presented a plan that illustrated a series of large parks connected by parkways within six miles of the State House.

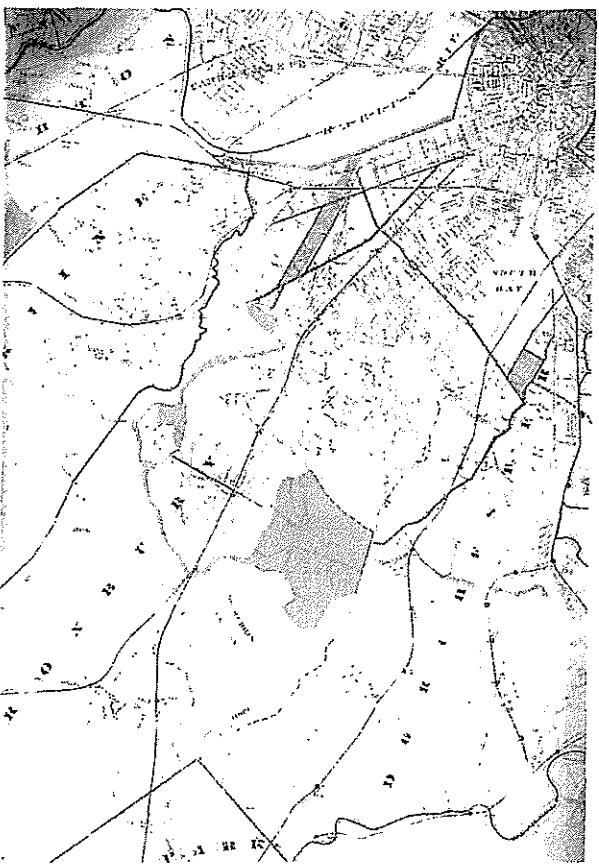
In May of 1875 the Boston Park Act was passed by the Legislature and approved by a majority of voters of Boston on June 9, 1875. This important piece of legislation allowed for parks within the Boston city limits, although adjoining cities and towns could also participate under certain conditions. This act again set in motion the movement for public parks and led to the establishment of the Olmsted system of parks.

In 1875 Bowditch also published a second plan (Figure 2-5), which was more compact and coherent than Copeland's and included the upper valley of the Muddy River as a link between the Back Bay and Jamaica Pond, thus anticipating the Frederick Law Olmsted plans. The City of Boston also consulted Frederick Law Olmsted as early as 1875. The 1875 First Report of the Board of Commissioners acknowledges "in making the locations herewith presented, the Commissioners have sought the professional advice of Mr. Frederick Law Olmsted, upon the general scheme, rather than upon the minor details."

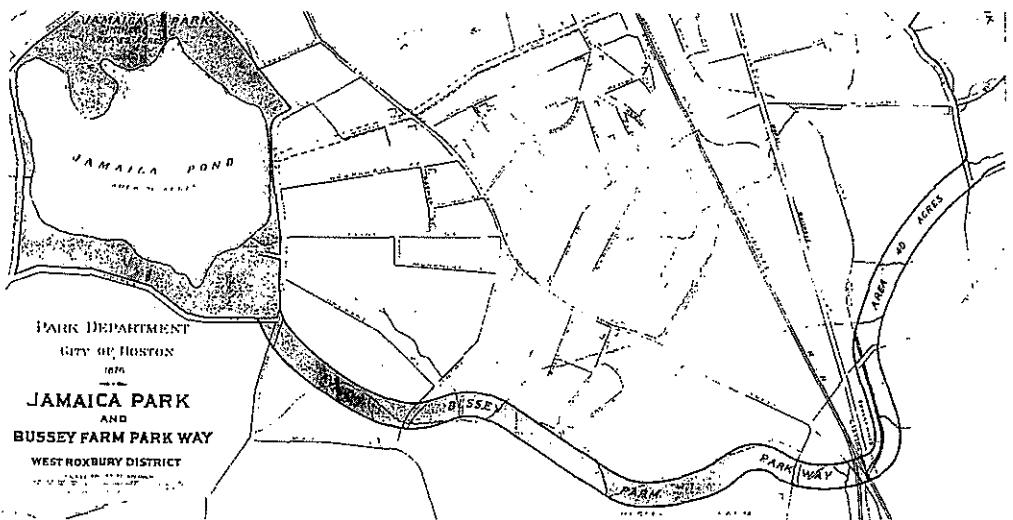


**Figure 2-5** **Map of Metropolitan Boston, Showing the Rural Parks Proposed by Ernest W. Bowditch, 1875. Map Collection, Harvard College Library. (Figure 25 Zaitzevsky)**

The Second Report in 1876 established many of the principles that would be followed and included two lithographs directly relating to the proposed parkway to connect Jamaica Pond to West Roxbury Park (Franklin Park). The first plan is titled "Proposed Parks and Parkways" (Figure 2-6), illustrated the parks and parkway proposed for the entire system of parks for the City. The second plan is titled "Jamaica Park and Bussey Farm Parkway, West Roxbury District" (Figure 2-7), illustrated the proposed parkway between Jamaica Park and West Roxbury Park (Franklin Park).



**Figure 2-6 Parks and Parkways Proposed by the Boston Park Commissioners in 1876. Lithograph, from City of Boston Park Report, Doc. No. 42-1876.**



**Figure 2-7 Plan Titled Jamaica Park and Bussey Farm Parkway, West Roxbury District Proposed by the Boston Park Commissioners in 1876. Lithograph from City of Boston Park Report, Doc. No. 42-1876.**

Also contained within the Second Report is the well known “Sketch Showing Arrangement for Park-way with Adjacent Streets and Building Lots” (Figure 8) that is often mistaken for a design section for the Arborway, which is included in the report as “a sketch of a park-way as described accompanies this report”.<sup>1</sup>



**Figure 2-8 Sketch Showing Arrangement for Park-way with Adjacent Streets and Building Lots, from City of Boston Park Report, Doc. No. 42-1876.**

## 2.2.2 Frederick Law Olmsted, Sr. Period (1879-1897)

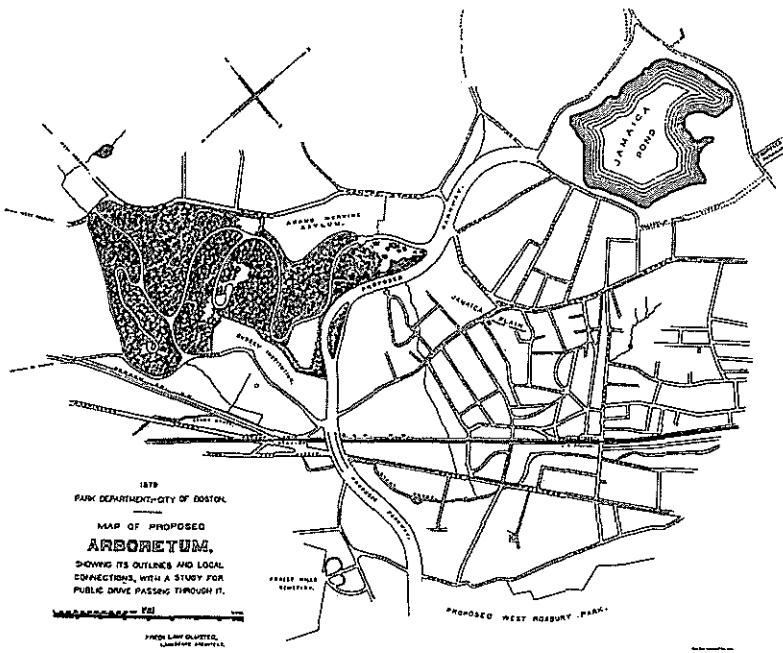
In December 1878, Frederick Law Olmsted, Sr. (1822-1903) entered into a contractual arrangement with the Boston Park Commission, although his services were at first only for the Back Bay Park. According to Zaitzevsky, “in the 1879 Fifth Annual Report, the second year of Olmsted’s formal involvement with the Boston Park System, he confirmed the Commissioner’s description of a triad of circulation routes for carriages, saddle-horses, and pedestrians.”<sup>2</sup> This description was in the 1876 Second Annual Report.

In 1879 Olmsted was also working on a design for the Arboretum under a private arrangement with Charles Sprague Sargent the Director of the Arboretum. Olmsted prepared a plan titled “Plan of the Parkway from Jamaica Park to Franklin Park” (Figure 2-9). He also prepared a plan titled “Map of Proposed Arboretum Showing its Outlines and Local Connection, with a Study for Public Drive Passing Through It”. The plan showed the proposed Arboretum and three entries into the Arboretum from the Parkway; the Forest Hills and Centre Street entrances and a third entry approximately mid-way between the other two. Construction of the Arboretum began in 1883 and “road building and major construction work in the Arboretum, took about ten years to complete.”<sup>3</sup>

<sup>1</sup> “Second Annual Report of the Board of Commissioners of the Department of Parks for the City of Boston, 1876, City Document No. 42, p. 12 and foldout map.

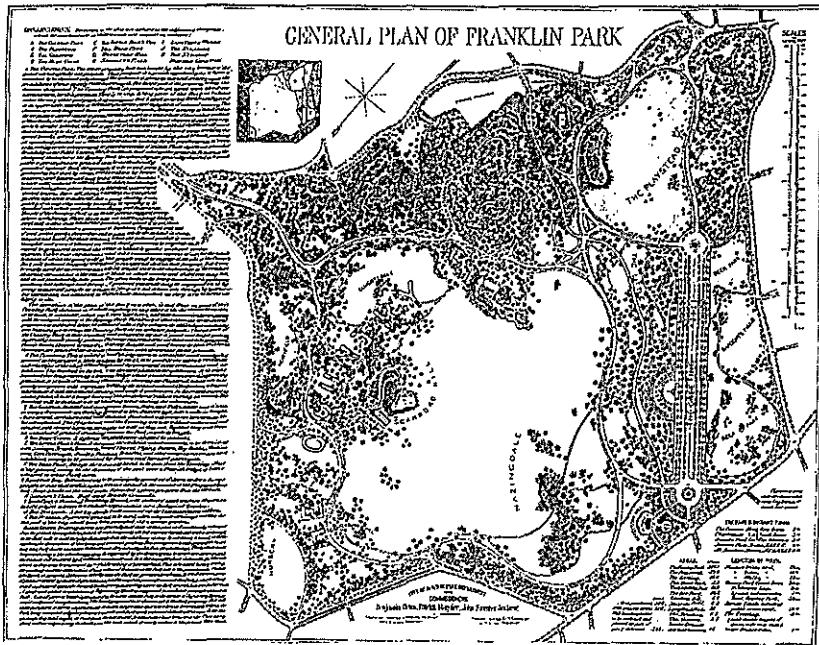
<sup>2</sup> “Jamaica Pond and the Arborway” (draft submission) Cynthia Zaitzevsky editor, June 1987, Department of Environmental Management, DEM Contract No. 190-85, p. I.5.

<sup>3</sup> Frederick Law Olmsted and the Boston Park System, Cynthia Zaitzevsky, The Belknap Press of Harvard University Press, Cambridge, MA. 1982. p. 64.



**Figure 2-9** Olmsted's Plan for the Arnold Arboretum, 1879. Lithograph. FLONHS #902-Z22. (Zaitzevsky)

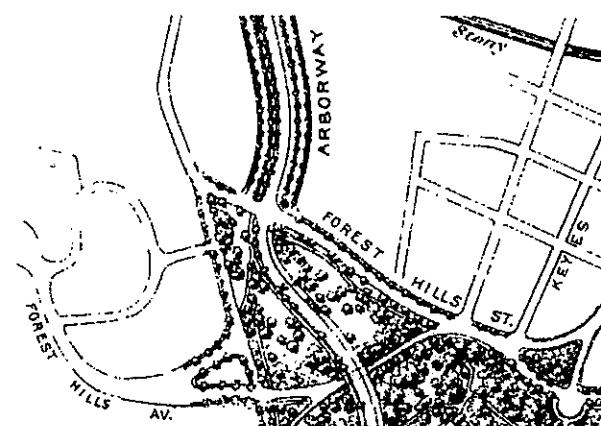
On January 30, 1886, Olmsted formally presented his plan for Franklin Park to Mayor O'Brien and the park commissioners. The plan titled "General Plan of Franklin Park" (Figure 2-10) showed the Forest Hills entrance and the Arborway connection.



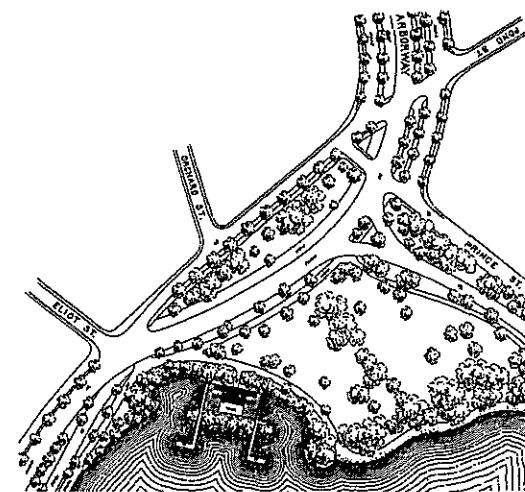
**Figure 2-10 General Plan of Franklin Park by Frederick Law Olmsted, 1885. Lithograph. FLONHS.**

In 1891, the City Council and the Mayor finally approved appropriations for additional land purchases. These land takings and other political actions mark the most intensive period of the Olmsted firm's involvement in the design of the Boston Park System. Several plans produced during 1891 illustrate Olmsted's further design of the parkway system connecting Jamaica Park to Franklin Park. They were published as lithographs in 1892.

- The “Revised General Plan of Franklin Park” dated December 1891 showed the parkway meeting the Forest Hill entry at Forest Hills Street and Morton Street. This plan shows the area of what today is Shea Circle at the Forest Hills Entrance to Franklin Park (Figure 2-11).
- The 1892 lithograph plan titled “Preliminary Plan for Jamaica Park” prepared by Olmsted showed the Arborway as it connects to Jamaica Park at Prince Street. This plan shows the area of what today is Kelley Circle (Figure 2-12).



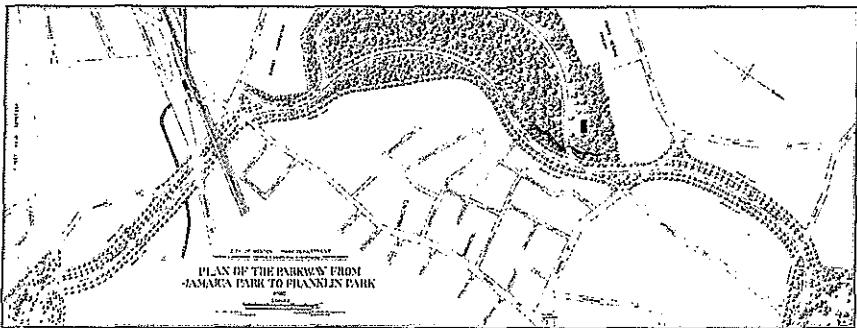
**Figure 2-11 The Arborway at Franklin Park Forest Hills Entrance, Portion of the Revised General Plan of Franklin Park, by Frederick L. Olmsted & Company, 1892. Lithograph. FLONHS.**



**Figure 2-12 The Jamaicaway at Jamaica Pond (Kelley Circle), Portion of the Preliminary Plan for Jamaica Park by Frederick L. Olmsted & Company, 1892. Lithograph. FLONHS.**

On April 29, 1892 land was taken for the parkway under Chapter 185 of Acts of 1875. Two Olmsted plans (FLONHS #901-17 and # 901-19) showed the current land ownership with the location of the proposed parkway between Jamaica Park and the Arboretum and between the Arboretum and Franklin Park overlaid on the plans. The Board adopted the name, Jamaicaway for the parkway at Jamaica Park and the name Arborway for the parkway that connected Jamaica Park to Franklin Park.

The key drawing, however, for this period is the 1892 lithograph plan by Frederick Law Olmsted titled “Plan of the Parkway from Jamaica Park to Franklin Park” (Figure 2-13). On this plan, the parkway is labeled the Arborway. This lithograph was published in the 1892 Annual Report of the Board of Commissioners.

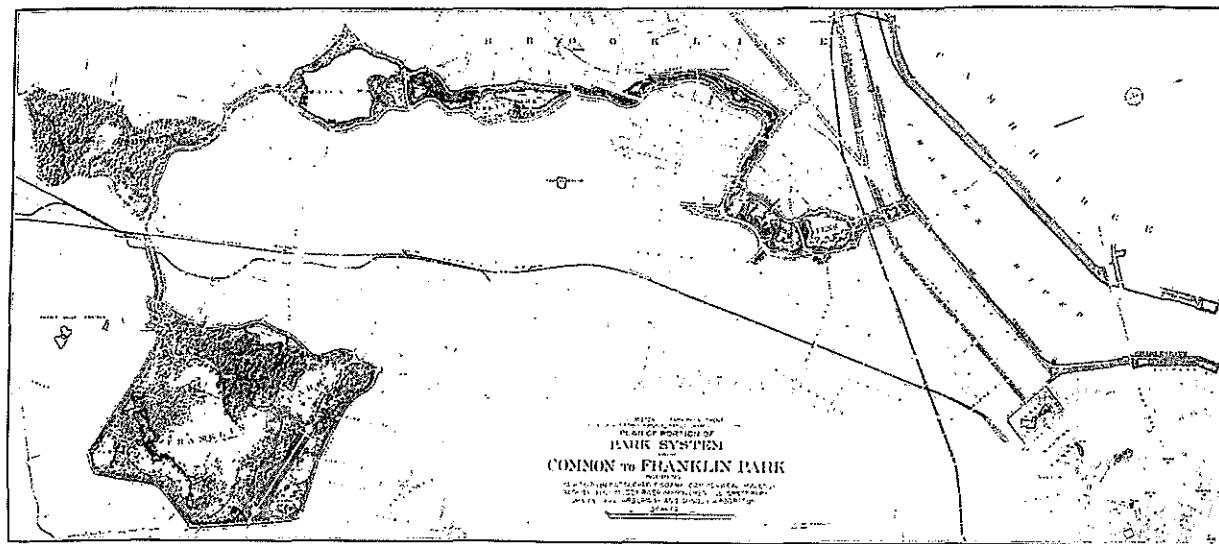


**Figure 2-13 Plan of the Parkway from Jamaica Park to Franklin Park, December 1892**  
**Lithograph, Olmsted, Olmsted and Eliot. FLONHS, #901-55tc1.**

By 1893 the parks and parkways were under construction and included a drive, ride and walk. In 1894 a drawing prepared by Olmsted, Olmsted & Eliot illustrated the entire park system and parkways. The title is “Plan of Portion of Park System Common to Franklin Park including Charles River Basin, Charlesbank, Commonwealth Avenue, Back Bay Fens, Muddy River Improvement, Leverett Park, Jamaica Park, Arborway and Arnold Arboretum” (Figure 2-14). By 1894 the construction of the Parkway was nearing completion and the Forest Hills Entrance at Franklin Park was completed.<sup>4</sup> The park reports did not indicate specifically how much of the parkways were actually constructed by 1894.

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<sup>4</sup> “Franklin Park Historic Landscape Report” (draft submission) Cynthia Zaitzevsky editor, June 1987, Department of Environmental Management, DEM Contract No. 190-5, Chronology, p.4.



**Figure 2-14 Plan of the Park System from the Common to Franklin Park, 1894  
Lithograph, Olmsted, Olmsted and Eliot. FLOHNS. (Zaitzevsky)**

The Twentieth Annual Report of the Board of Commissioners (1895) contained the following restrictions on park frontages for the properties along the parkway:

- Dwellings only;
- Seventy foot maximum height;
- No tenements;
- Twenty foot minimum set back, and
- Billboards on lands bordering parks must be limited.

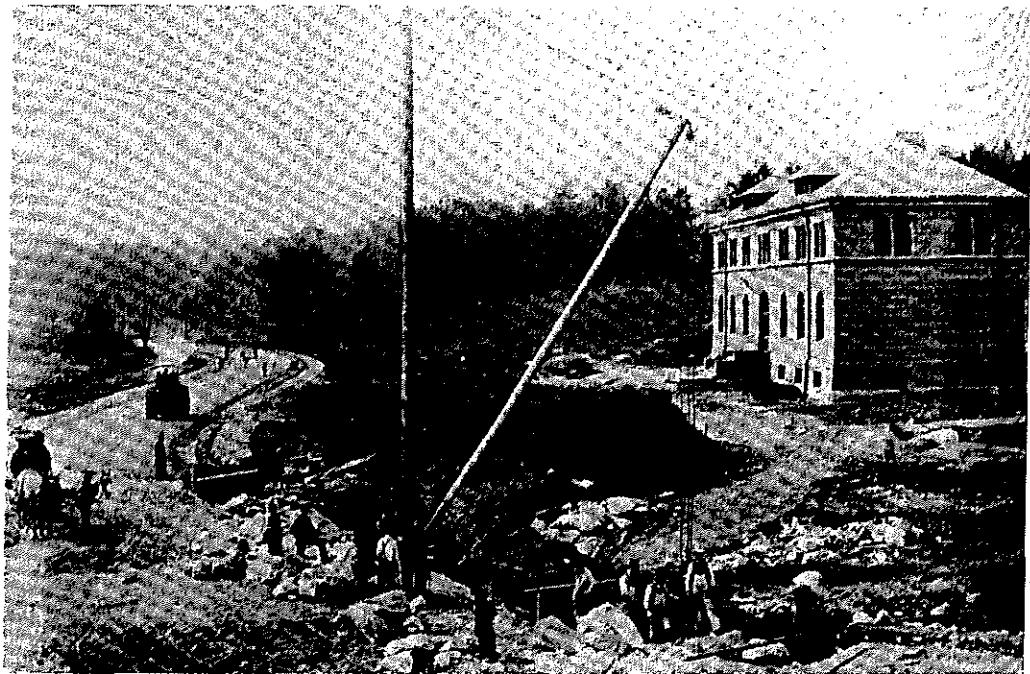
Also within the 1895 report Charles Eliot reported to the Park Commission that important elements of the park system were still incomplete. Zaitzevsky reports that "ten years after Olmsted signed his first contract with the Boston Park Commission, two major elements in the continuous portion of the park system, the emerald necklace," as it has come to be called, had not yet been started: the Muddy River Improvement and Jamaica Park. Preliminary work was in progress on Marine Park in South Boston. Portions of the parkway from the Fens to South Boston were then being built, although this massive project took many years to accomplish. By 1895, however, when Olmsted retired, "the emerald necklace was essentially complete."<sup>6</sup>

In her book, *Frederick Law Olmsted and the Boston Park System*, Cynthia Zaitzevsky further discusses the construction methods and the completion of the parkways in Chapter XI "Building the Parks". "Possibly more time, money, and manpower went into the building of the roads, walks, and bridle paths of the Boston parks than into any other construction activity." This chapter also contains and illustration of the construction of the drive in the Arboretum in an area adjacent to the Arborway, which can aid our understanding of the construction methods for the Arborway as well. "In the foreground of [Zaitzevsky's] Figure 128 (Figure 2-15), showing construction of the drive in the Arnold Arboretum about 1892, work is in progress near the main entrance from the Arborway. A derrick is lifting stones, probably for construction of the culvert that runs under the drive at this point. Farther back, a steam roller is going over the newly surfaced road, while the right is the

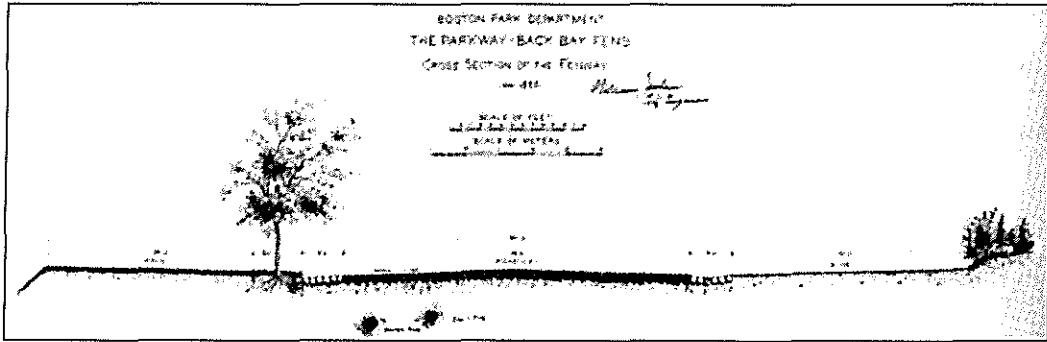
<sup>3</sup> "Jamaica Pond and the Arborway" (draft submission) Cynthia Zaitzevsky editor, June 1987, Department of Environmental Management, DEM Contract No. 190-85, Chronology, p.5.

<sup>6</sup> "Frederick Law Olmsted and the Boston Park System, Cynthia Zaitzevsky, The Belknap Press of Harvard University Press, Cambridge, MA. 1982, p. 81.

just completed administration building.”<sup>7</sup> She concludes that the methods and machines used in constructing the Boston parks were the customary ones of the day.



**Figure 2-15 Construction of the drive in the Arboretum, circa 1892. (Zaitzevsky)**



**Figure 2-16 Cross-Section of the Fenway in 1888 (Zaitzevsky). [While this drawing is not for the Arborway, it may show typical road edge conditions constructed throughout the Emerald Necklace.]**

The 1896 Twenty-first Annual Report of the Board of Commissioners under the Report of the Landscape Architects contained the first statement on the use of the bicycle in the Boston parks and stated:

“The demand for special bicycle ways in public parks and parkways has been under consideration by the Board. A rural park is to serve the greatest good to the greatest number, but not in all possible ways. Most

<sup>7</sup> Ibid, p. 161.

important is foot travel. The bicycle is a silent steed, much more dangerous than the horse. Speed of passage through scenery makes its use inconsistent with park purpose. A park is a preserve of scenery, not a racetrack.”<sup>8</sup>

In 1897 “John A. Pettigrew was appointed Superintendent for the Boston Parks”.<sup>9</sup> Pettigrew began his later controversial changes to the park system. Also in 1897 Frederick Law Olmsted Jr. and John Charles Olmsted (Olmsted Brothers Firm) were appointed by the Boston Park Department as the landscape architectural advisors for the park system.

### 2.2.3 Transition to Automobile Use (1898-1949)

The turn of the 20<sup>th</sup> Century brought the beginning of many changes to metropolitan Boston, in part due to the increased popularity of bicycles and the gradual emergence of the automobile as a preferred form of transportation. By 1898, fewer than 30 companies were manufacturing automobiles in the U.S., but this changed dramatically in 1899 when Henry Ford left Detroit Edison to focus on the fledgling auto industry.<sup>10</sup>

In 1898 “Parkman Drive was completed and Perkins Street was improved and the trees were finally planted along the parkways”.<sup>11</sup> “Most of the trees along the parkways, the line trees as they were generally called, were planted in the late 1890s under John A. Pettigrew’s superintendency. In 1897 and 1898 Pettigrew planted the American Lindens ordered by the Olmsted firm along the Riverway, but continued the Red Oak from Huntington Avenue at the beginning of the Jamaicaway all the way to Franklin Park from Franklin Park to Huntington Avenue.”

The Arborway was differentiated by the addition of shrub roses in the loam spaces between the trees (Figure 2-17).<sup>12</sup> Zaitzevsky’s footnote for this quote goes on to explain “A planting order list dated Sept. 3, 1896, at the Olmsted National Historic Site, Brookline, indicates that the firm was still intending to use tulip trees and cucumber trees on the Arborway and had ordered 550 of each, to be delivered the following spring”.<sup>13</sup> This is an example of the type of Pettigrew changes mentioned in the John C. Olmsted report in 1900 below. Note also in Figure 2-17 that the Forest Hills Viaduct (shown in Figures 2-18 and 2-19) is in the distance.

<sup>8</sup> “Jamaica Pond and the Arborway” (draft submission) Cynthia Zaitzevsky editor, June 1987, Department of Environmental Management, DEM Contract No. 190-85. Chronology, p. 6.

<sup>9</sup> Ibid, Chronology, p. 6.

<sup>10</sup> “Automobile History Before 1900” courtesy the Antique Automobile Club of America.

<sup>11</sup> “Jamaica Pond and the Arborway” (draft submission) Cynthia Zaitzevsky editor, June 1987, Department of Environmental Management, DEM Contract No. 190-85. Chronology, p. 6.

<sup>12</sup> “Frederick Law Olmsted and the Boston Park System, Cynthia Zaitzevsky, The Belknap Press of Harvard University Press, Cambridge, MA. 1982, p. 194.

<sup>13</sup> Ibid, p. 248.



**Figure 2-17 Young Oaks and Shrub Roses on the Arborway, 1903, from City of Boston, Doc. No. 28-1904 (Zaitzevsky)**

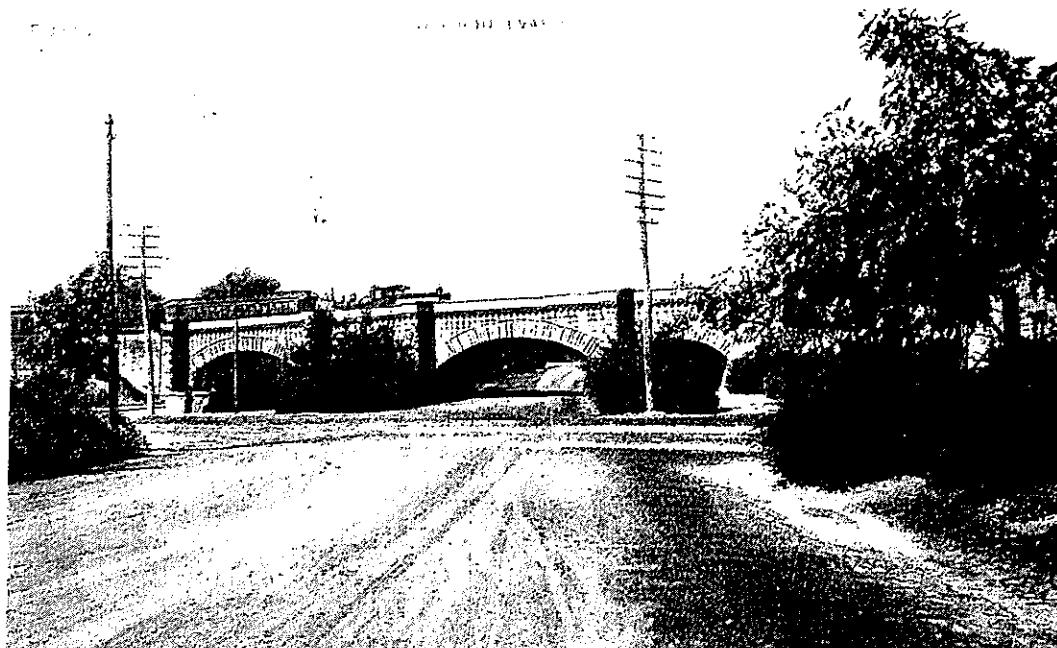
In circa 1898 the Forest Hills Viaduct was constructed. “Just beyond the Arboretum a massive granite viaduct was built from plans by Shepley, Rutan, and Coolidge to carry the New York, New Haven, and Hartford Railroad lines over the Arborway. The Forest Hills Viaduct was one of several railroad bridges built on this part of the line in the late 1890s, but because of its location over part of the park system, it was the only one to be designed by an architectural firm. It has five arches, corresponding to each division of the parkway: a side road, walk, drive, bridle path, and side road.” (Figures 2-18 and 2-19)<sup>14</sup>



**Figure 2-18 Forest Hill Station with Parkway, Landscaping, Lighting and Viaduct, July 1919, SPNEA.**

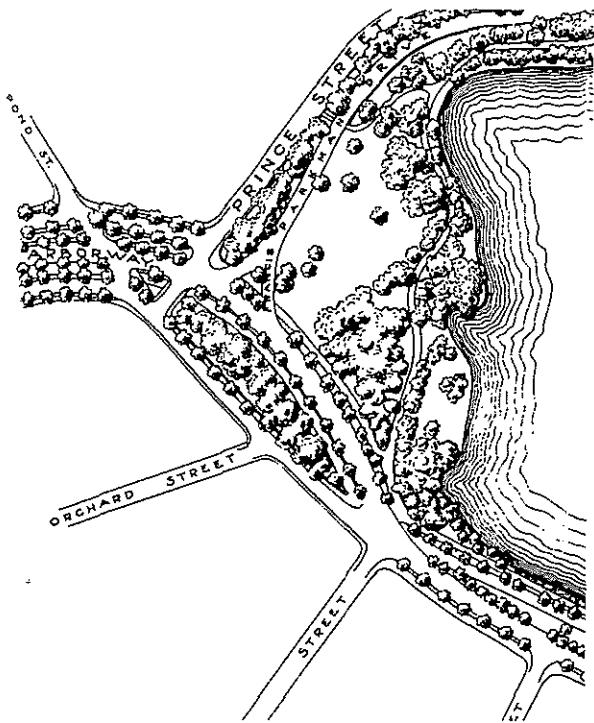
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<sup>14</sup> Ibid, p. 175-176.



**Figure 2-19 Parkway Showing Planting and Viaduct, May 1925, SPNEA.**

On April 6, 1900 John C. Olmsted toured the park system with Pettigrew and wrote a report that was extremely critical of Pettigrew's changes to the original Olmsted design for the park system. These changes were known to have included changes generally in planting plans and specifically plant species on the parkways. Also in 1900 a new lithograph plan was issued showing Jamaica Park and what is now Olmsted Park as one plan titled "Olmsted Park" (Figure 2-20). The area at Kelley Circle is the same design as the 1892 Jamaica Park plan.



**Figure 2-20 The Jamaicaway at Jamaica Pond (Kelley Circle), Portion of the Plan Entitled “City of Boston Park Department Olmsted Park” by Frederick L. Olmsted & Company, 1900. Lithograph. FLONHS.**

In the 1901 Commissioners Report under “Park Statistics” the Commissioners estimated that there were over thirty-five miles of driveways, over fifty-seven miles of walks, and over eight miles of bridle paths in the park system, not all of which were complete.<sup>15</sup>

Between 1904 and 1908 the parkway roads continued to deteriorate due to the increased use by automobiles. In the 1904 Superintendent’s Report, the roads required extensive repairs as they were worn to the foundations in many places and there were no appropriations to repair them. [Forest] plantations were also not receiving the necessary attention.<sup>16</sup> The 1908 Commissioner’s Report, noted continued deterioration of the roads. While the macadam surface could support traffic up to 15 mph, it disintegrated under traction and twisting of rear wheels of cars. A new road surface was necessary.<sup>17</sup>

The Olmsted Firm was commissioned in 1910 by the Boston Park Department to evaluate the park system. John Charles Olmsted reviewed the parks and his notes provide a useful reference for the general condition of the parks system in 1910 some 15 years after Olmsted Sr.’s involvement. Also in 1910 Arthur A. Shurtliff (1870-1957) was appointed landscape architectural advisor to the Boston Park Department. Arthur A. Shurtliff had started his professional career in the Olmsted offices and opened his own practice in 1904. He changed his name to Shurcliff in 1930.

The 1911 Commissioners Report provides information on the parkway plantings by explaining the planting philosophy and proposed policies to be adopted. It also provides a description of the parkway plantings, the use of shrubs instead of lawns, and maintenance issues.

<sup>15</sup> Frederick Law Olmsted and the Boston Park System, Cynthia Zaitzevsky, The Belknap Press of Harvard University Press, Cambridge, MA. 1982. p.161.

<sup>16</sup> Ibid, Chronology, p. 8.

<sup>17</sup> Ibid, Chronology, p. 8.

"In the original plans for the Arborway the planting, except where were widenings of the planting spaces or walls to be covered or other special conditions, was intended to be limited to trees and grass, as in Commonwealth Avenue. The narrow planting strips have been since planted, in general, with continuous shrubbery, without clipped turf. From the point of view of visitors passing through the Arborway in vehicles the effect has been good, on the whole, although the bare cultivated earth in front of and amongst the shrubs is distressing to the eye. This kind of planting has differentiated the Arborway from the more ordinary type of wide parkway, such as Commonwealth Avenue, and has afforded an attractive foreground of varied foliage and periodical bloom. It must be recognized, however, that this treatment, in which there is a strong expression of wildness and rusticity, is of questionable appropriateness where the constructional lines of the parkway are formal to the extent of being parallel horizontally and vertically and where the planting strips are so narrow as is the case from Pond Street to Centre Street, and from South Street to Forest Hills Street, and it will be unquestionably inappropriate when the parkway frontage is fully occupied by apartment houses and residences of a city type. Therefore the policy should be to gradually formalize the style of maintenance of these planting strips as the character of adjourning private improvements becomes more costly and more citified."<sup>18</sup> "On the other hand the stiffness and nakedness of the wall along the Arboretum frontage should be relieved by vines to a greater extent and the horticultural appearance of the steep hillside of orchard like thorn trees should be relieved by additional and more crowded woodland planting."<sup>19</sup>

During the 1920s, Boston experienced continued pressure to modify the parkways to accommodate automobile traffic. The 1924 Forty-eighth Annual Report of the Board of Commissioners stated that in order to meet the needs of increasing automobile traffic, reconstruction of the parkways was needed in the interest of public convenience and safety. "At the junction of Jamaicaway and Prince Street, which is one of the most dangerous corners in the park system, a rearrangement of the road with the removal of the stone wall and change of the foot paths was carried out."<sup>20</sup> The most pressing demand however on the Boston Park Department was modernizing the roads, and straightening them. An additional example on the Arborway was the straightening of Morton Street, which was under study at that time. The consensus was that the entire parkway system would need to be doubled in width to handle the increasing traffic load. The introduction of underpasses and overpasses was discussed since they could provide continuous flow on the parkways in Boston."<sup>21</sup>

The Annual Report of the Board of Commissioners of 1925 contains the report of the Deputy Commissioner, who noted work on the roads in the Fenway including widening roads in the Riverway. In an effort to accommodate automobile traffic and in consideration of park improvements, Arthur A. Shurtleff prepared a report titled "Future Parks, Playgrounds and Parkways", and prepared a plan for a rotary at the Forest Hills Entrance (Shea Circle) dated November 1925.

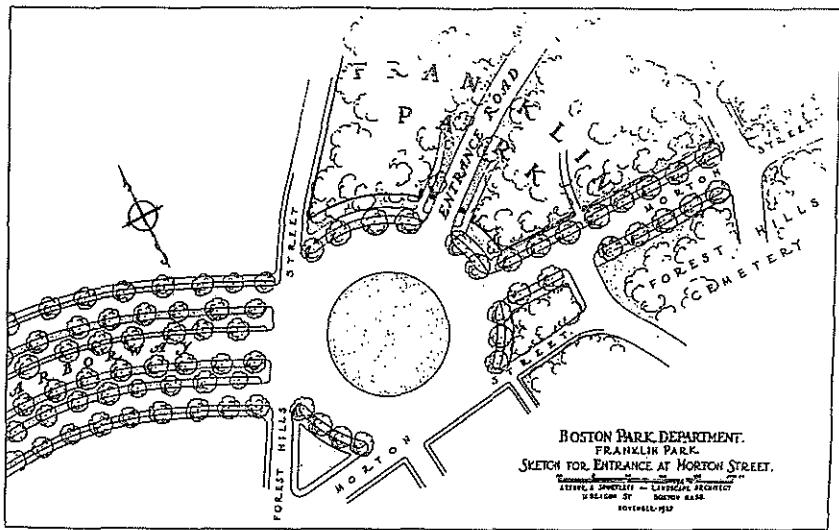
The plan titled "Franklin Park Sketch for Entrance at Morton Street", Figure 2-21, shows the new park entry, but is not the current rotary configuration of what is today called Shea Circle. Enclosed within the report is a plan titled "City of Boston Park Department Parkways", which illustrates the existing and proposed parkways and existing and proposed thoroughfares. It appears to have been executed.

<sup>18</sup> "Thirty-Sixth Annual Report of the Board of Commissioners of the Department of Parks for the City of Boston, 1911, pp. 70-71.

<sup>19</sup> *Ibid*, p.71.

<sup>20</sup> "Forty-eighth Annual Report of the Board of Commissioners of the Department of Parks for the City of Boston, for the year ending January 31, 1923," pp. 1-2.

<sup>21</sup> "Jamaica Pond and the Arborway" (draft submission) Cynthia Zaitzevsky editor, June 1987, Department of Environmental Management, DEM Contract No. 190-85, Chronology, p.10.



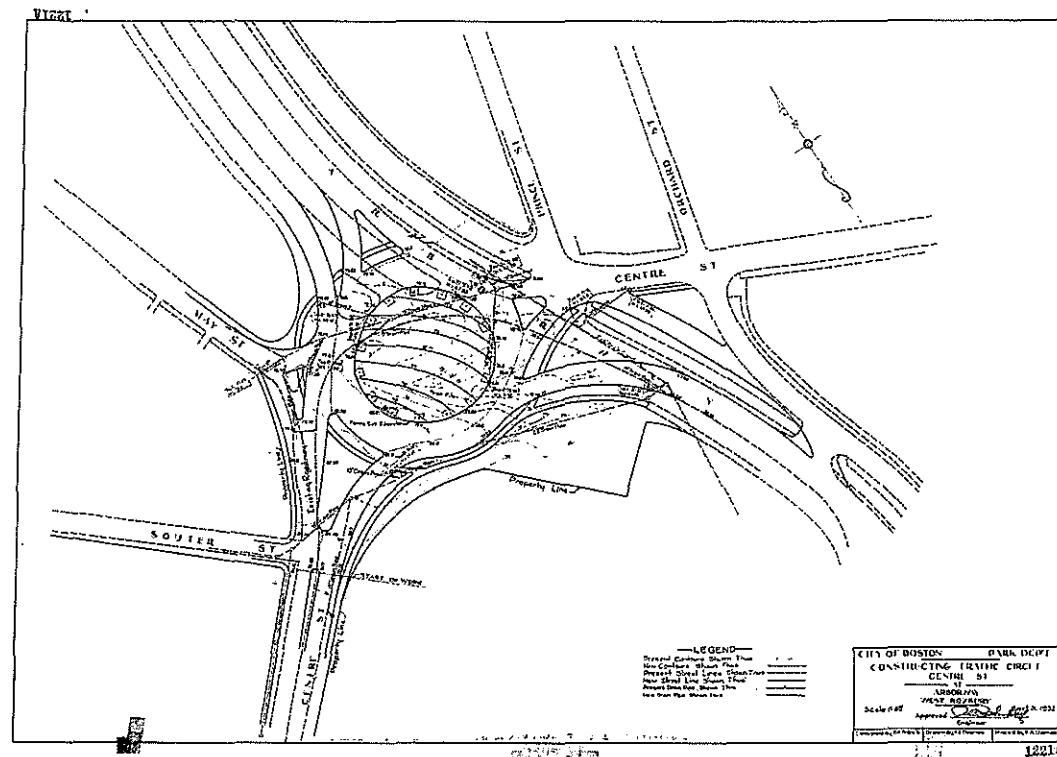
**Figure 2-21 Plan for the Area Now Called Shea Circle Titled “Franklin Park Sketch for Entrance at Morton Street,” Arthur A. Shurtleff, November, 1925. BPRD.**

In the 1927 Annual Report of the Commissioners recommended: “The most pressing demand on the department is the modernizing of the park roads by straightening, widening, or constructing parallel one-way drives, so as to adequately carry the ever-increasing number of motor vehicles using the parkways.”<sup>22</sup> The most important improvements of the past year were the rearrangement of the Fens roadways. The report noted, “the new boulevard, as constructed, is well lighted and replaces an area that was unsuitable for present conditions.”<sup>23</sup> It also said that the policy of permanent pavement on parkways and boulevards was continued and specifically mentioned a portion of the Arborway on the west drive, between Prince Street and Centre Street being resurfaced.

During the 1930s and 1940s pressures to modify the parkways become more critical. In 1932 the City is preparing plans to construct a rotary at the Arborway and Centre Street to accommodate automobile traffic. The plan titled City of Boston Park Department Constructing Traffic Circle Centre Street at Arborway, West Roxbury, shows a design by B. H. French. (Figure 2-22). The plan was executed and pedestrian and bridle path systems were modified and linkages were lost in that location.

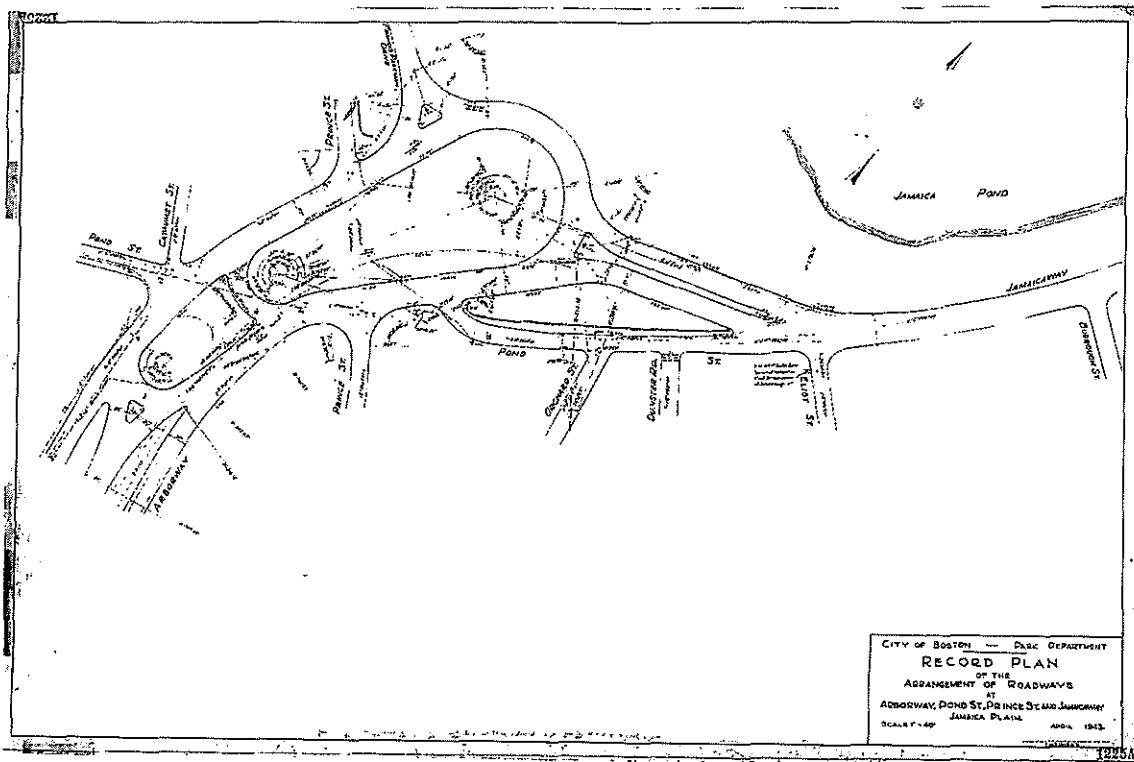
<sup>22</sup> Ibid. p. 10.

<sup>23</sup> “Fifty-second Annual Report of the Board of Commissioners of the Department of Parks for the City of Boston, for the year ending December 31, 1926, pp. 1-2.



**Figure 2-22 Plan for the Area Now Known as Murray Circle Titled City of Boston Park Department Constructing Traffic Circle Centre Street at Arborway, West Roxbury, by B. H. French, September 21, 1932. BPRD # 1221 A.**

By 1943, increased traffic at the junction of the Arborway with Prince Street and Parkman Drive (Kelley Circle) resulted in pressure to reconfigure the intersection to better accommodate the automobile. The plan titled City of Boston Park Department Record Plan of the Arrangement of Roadways at Arborway, Pond Street, Price Street and Jamaicaway shows these proposed modifications. (Figure 2-23). As was the case at Murray Circle, the new circle modified the pedestrian and bridle path and important linkages were lost at the intersection. The car was becoming dominant at the expense of the pedestrian and bridle path users.

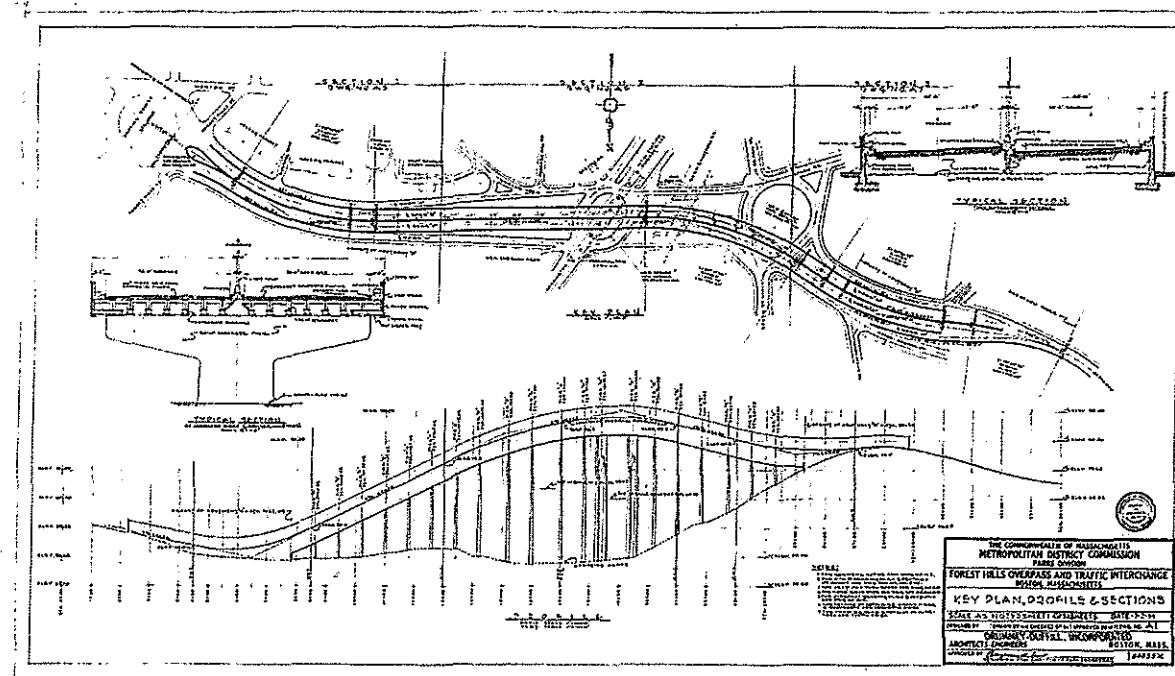


**Figure 2-23 Plan for Kelley Circle Titled City of Boston Park Department Record Plan of the Arrangement of Roadways at Arborway, Pond Street, Prince Street and Jamaicaway Jamaica Plain,” April 1943 (BRRD # 1225A).**

#### 2.2.4 An Urban Roadway (1950 to present)

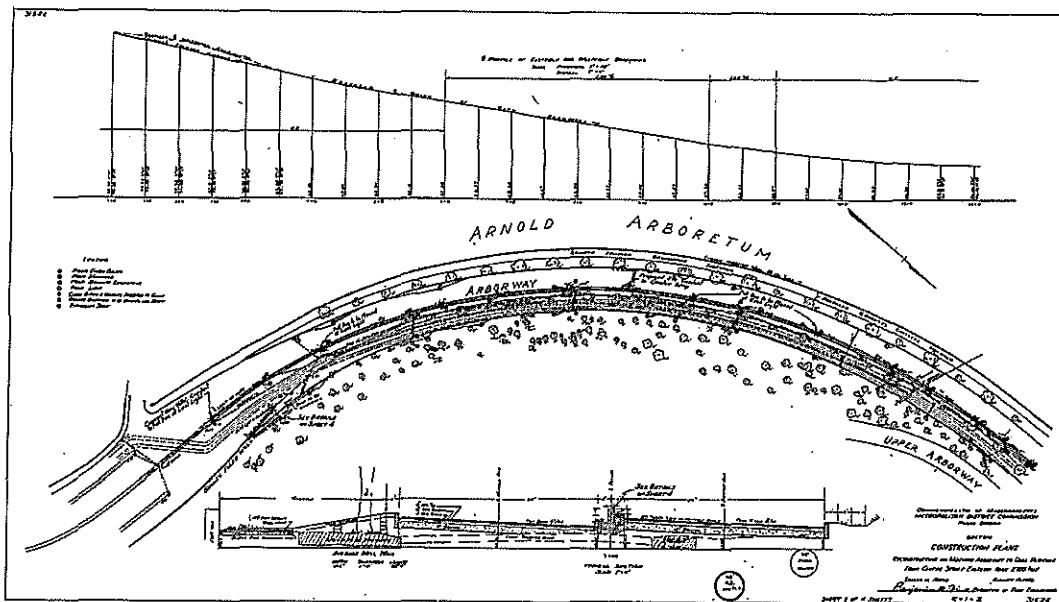
The most serious modification to the Arborway, however, occurs in the 1950s. Between 1951 and 1953 “The Forest Hills overpass (William J. Casey Overpass) is constructed, destroying the link of the Arborway that connected Arboretum with Franklin Park”.<sup>24</sup> The area adjacent to the rotary at the Franklin Park entry at Forest Hills Street and Morton Street was again modified to accommodate the new overpass. Figure 2-24 Drawing #A-1 Key Plan, Profile & Sections of the Forest Hills Overpass and Traffic Interchange, shows the overall new alignment of the parkway as an overpass.

<sup>24</sup> “Franklin Park Historic Landscape Report” (draft submission) Cynthia Zaitzevsky editor, June 1987, Department of Environmental Management, DEM Contract No. 190-5, Chronology, p.9.

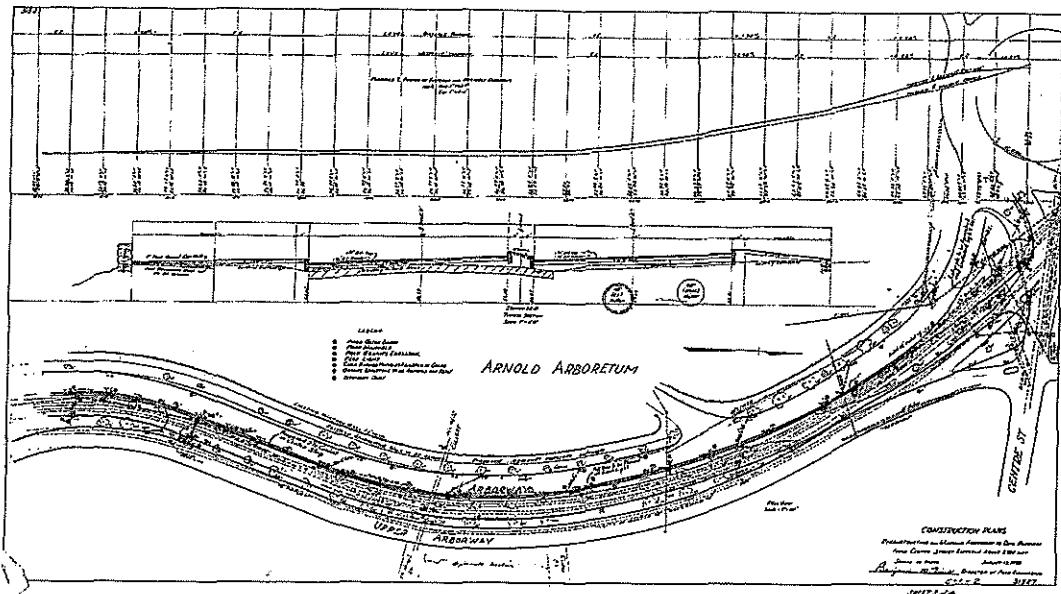


**Figure 2-24 Key Plan, Profile and Sections of the Forest Hills Overpass and Traffic Interchange, July 1951. Drummeey Duffill, Inc. MDC Parks Division, #A1.**

The 1953 "Construction Plans Reconstructing and Widening Arborway to Dual Parkway from Centre Street Easterly, were prepared by Benjamin W. Fink, Director of Park Engineering (Figures 2-25 and 2-26). These plans show existing trees to be removed to reconstruct the parkway as well as modifications to the Centre Street intersection.



**Figure 2-25 Plan Titled "Construction Plans Reconstructing and Widening Arborway to Dual Parkway from Centre Street Easterly about 2700 Feet" Sheet 1 of 4, by Benjamin W. Fink, August 17, 1953 (MDC # 31526).**



**Figure 2-22 Plan Titled “Construction Plans Reconstructing and Widening Arborway to Dual Parkway from Centre Street Easterly about 2700 Feet” Sheet 2 of 4, by Benjamin W. Fink, August 17, 1953 (MDC # 31527).**

In the early 1950s, the Metropolitan District Commission appears to have completed drawings for the parkway, even though the Boston Parks and Recreation Department retained ownership of the parkway. However,

“In October 1956, the City of Boston’s Parks and Recreation Department transferred to the Metropolitan District Commission (MDC) the “care, control, and maintenance” of the Riverway, the Jamaicaway, and the Arborway, as well as several other parkways included in the study area. The transfer was made in accordance with the provisions of Chapter 581 of the (State) Acts of 1956. It also included the care of paths and other areas located within 25 feet of the parkways as well as streetlights, catch basins, and drains, which means that the areas of the ride within the Arborway also transfer to the MDC. The intent was to link the parkways under the control of the MDC and to provide continuous roadway connections.”<sup>25</sup>

In effect, this changed the parkways from roads for pleasure driving to an urban commuter route.

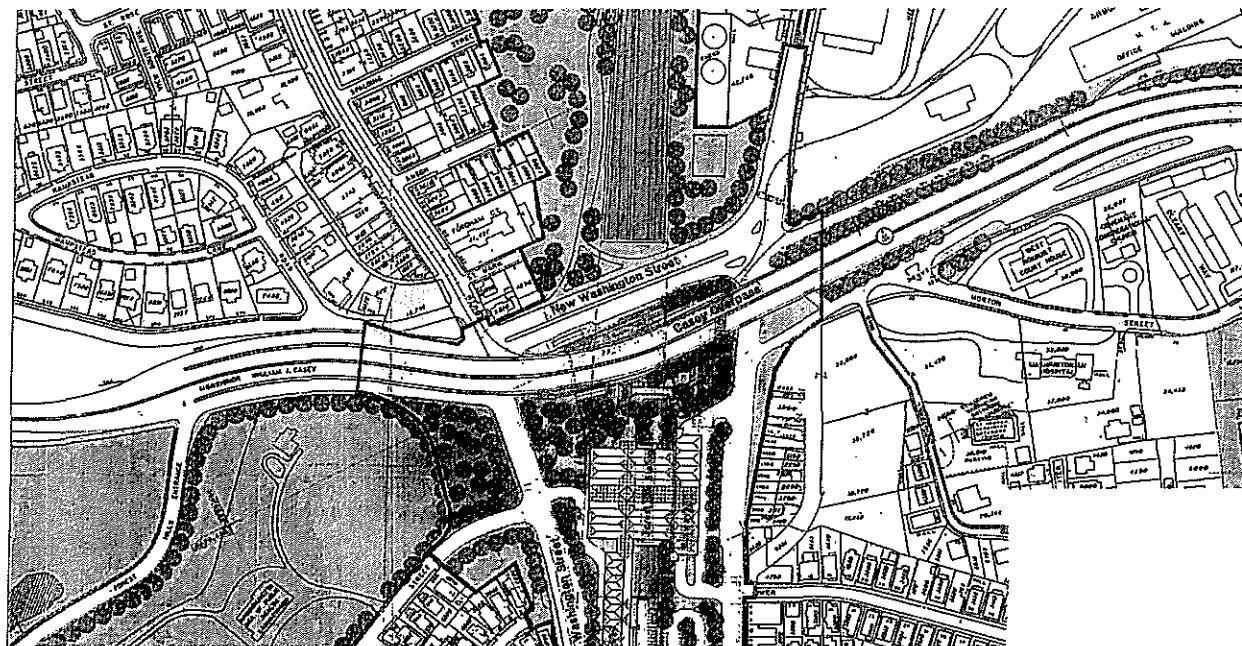
In 1967, Highway Engineering, Inc prepared a study for the Arborway, Jamaicaway and Riverway for the MDC. The plan was titled “Commonwealth of Massachusetts Reconstruction of Arborway, Jamaicaway and Riverway”. This plan was not received well by the Community and greenspace advocates, who felt that the proposed roadway configuration adversely affected the community, and as a result it was eventually shelved.

During the 1960s and 1970s, the historic importance of the Emerald Necklace Park System began to be recognized, resulting in listings on the National Register as well their recognition as Boston Landmarks. In 1966, Arnold Arboretum was listed on the National Register of Historic Places, and it became a National Historic Landmark in 1976. The boundaries of the nomination were for the 265 acres of the Arboretum and did not include the Arborway.

In 1971, Olmsted’s Emerald Necklace including the parkways was listed on the National Register of Historic Places. The Arborway was described as starting at the intersection of Morton Street and Forest Hills Street and going to the intersection of the Arborway and Prince Street.

<sup>25</sup> “The Emerald Necklace Parks”, Shary Page Berg, Boston Landmarks Commission Environment Department City of Boston, p. 57.

In 1983, Southwest Corridor Project (MBTA contract #097-320) included work adjacent to Forest Hills Station and the Monsignor William J. Casey Highway (Forest Hills Overpass) (Figure 2-27). The plan proposed extensive planting both north and south of the overpass and new walks along New Washington Street to the north and new parkland to the south adjacent to Forest Hills Station. These plans were executed.



**Figure 2-27 Plan for Southwest Corridor Project MBTA Contract #097-320, Forest Hills Station Site Area Plan by Howard, Needles, Tammen & Bergendoff Dated September 1983, plan #A72790 Sheet 411 of 600.**

In 1980 and 1989, respectively, Franklin Park and the Emerald Necklace Parks (Jamaica Pond, Olmsted Park and the Riverway, including the parkways) were designated a Boston Landmark under Chapter 772 of the Acts of 1975, as amended. As stated in the nomination:

"The parkways meet the criteria for the protection area as defined in Chapter 772 of the Acts of 1975, as amended. Section 4, paragraph 3 states: "the Commission may designate any area in the city as a protection as herein provided upon a finding by the commission that the area to be designated is visually related to the landmark, landmark district or architectural conservation district, but is not necessarily of sufficient historical, cultural, or aesthetic significance to warrant designation as such. In determining the boundaries of a protection area, the commission shall consider the following elements: (b) Patterns or roads, paths, and alleys, which determine the size and shape of land parcels, which control vehicular and non-vehicular movement to and from the landmark, landmark district, or architectural conservation district."<sup>26</sup>

In 1989, Walmsley Pressley Joint Venture prepared the "Emerald Necklace Master Plan" for the Commonwealth of Massachusetts Executive Office of Environmental Affairs Department of Environmental Management under the Olmsted Historic Landscape Preservation Program. The master plan incorporated the surrounding parkways and recommended rehabilitation of the "ride" as a bicycle system within and between the parks. In the Walmsley Pressley master plan, only the portion of the Arborway defined by Kelley Circle and Murray Circle was included in the scope.

<sup>26</sup> "The Emerald Necklace Parks", Shary Page Berg, Boston Landmarks Commission Environment Department City of Boston, p. 54-55.

In 1991, the Halvorson Company Inc. prepared the “Franklin Park Master Plan” for the Commonwealth of Massachusetts Executive Office of Environmental Affairs Department of Environmental Management under the Olmsted Historic Landscape Preservation Program. Recommendations for the Forest Hills entrance to the Park were included within this document, but not for the Arborway or Shea Circle.

In 2000 Bruce Campbell & Associates, Inc. prepared a study “Arborway Traffic Calming Study” March 2000 for the Metropolitan District Commission. The study area was from Jamaica Pond to the Arboretum and includes Kelley and Murray Circles.

## **2.3 Historic Context and Evaluation of Periods of Significance**

### **2.3.1 Context - The Parkway Concept in History and its Development in Boston**

The Arborway is an excellent example of an early parkway, a nineteenth-century concept that developed simultaneously in Europe and in the United States. At that time, the wealthy were traveling abroad on the Grand Tour, as were designers such as Andrew Jackson Downing and Frederick Law Olmsted, Sr. “Olmsted had been impressed during his European trip of 1859 with the Avenue de l’Imperatrice (now Avenue Foch) in Paris, in which a central carriageway, a pedestrian promenade, and a bridle path were flanked by hundred-foot-wide, strips of lawn and scattered trees. Olmsted seized on the idea of separating carriages from carts and other heavy traffic as the key element of the parkway.”<sup>27</sup>

In the United States, Olmsted and others before him were proposing to connect a series of park spaces within an urban area by parkways, and Boston citizens were no exception. In October 1869, a group of citizens presented a petition to the Boston City Council for a public park. As a result of the petition, the Common Council established a Joint Special Committee to report on what action the city government should take. This committee held two public meetings in November 1869 and as a result of these meetings requested Mayor Nathaniel B. Shurtleff to petition the Massachusetts General Court to pass an act authorizing the City of Boston to purchase land for one large park or several small parks. Between 1869 and 1874, Uriel Crocker, Horace W. Cleveland, and Robert Morris Copeland all prepared similar proposals to develop a linear park connecting natural features (Figures 2-3,2-4, and 2-5).

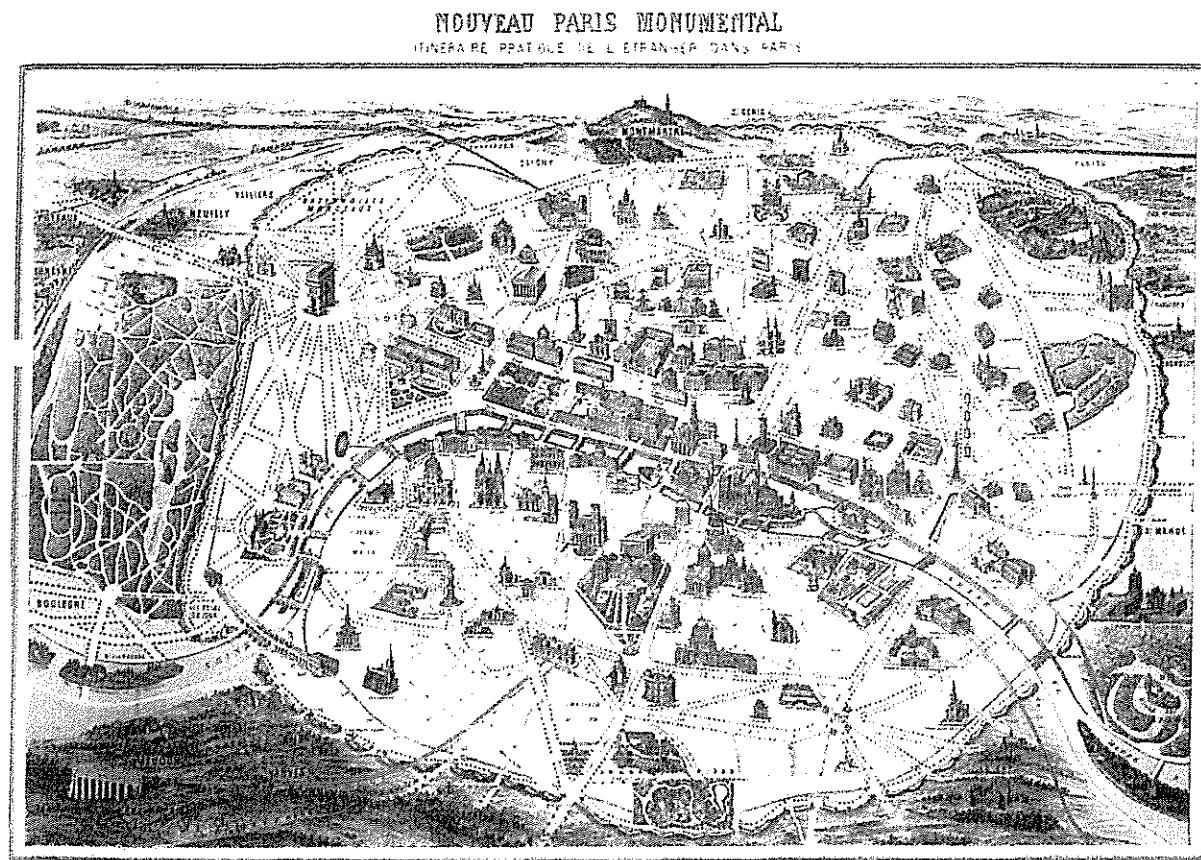
As a result, by May of 1875 when the Boston Park Act was passed by the Legislature, the idea of a park system connected by parkways was an accepted concept. The best documentation of this idea in Boston, which establishes the context for the parkway, was contained in the 1876 Annual Report of the Boston Park Commissioners. The report included a discussion of the concept of the “park-way” and referenced Commonwealth Avenue and parts of Chester Park in Boston as “imperfect illustrations”, but said that “good examples exist, or are in process of construction, in New York, Brooklyn, Washington, Chicago, Buffalo, San Francisco, etc.”<sup>28</sup> Americans were still looking to Europe for inspiration, so European examples, specifically in Paris, Madrid and Vienna, were discussed at length. The Avenue de Bois de Boulogne in Paris, leading from the Champs Elysees to the Bois de Boulogne, was described. “It is 390 feet wide, has a broad driveway, a saddle-pad, and promenades, trees, shrubbery, and lawn, and is bordered by elegant houses and gardens, facing the avenue, though chiefly approached by streets from the outside”<sup>29</sup> It is interesting to note that the Paris park system and its system of boulevards were designed and constructed between 1850 and 1870 during the Second Empire under Napoleon III with direction by Baron Georges Haussmann so by the time of the 1876 report they were well known to the citizens of Boston who had traveled abroad. (Figure 2-28). Olmsted visited Paris in 1859 after several of the Paris boulevards were either under construction or completed.

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<sup>27</sup> Frederick Law Olmsted, Designing the American Landscape, Charles E. Beveridge and Paul Rocheleau, Rizzoli International Publications, Inc., New York, New York 1995, p. 48.

<sup>28</sup> “Second Annual Report of the Board of Commissioners of the Department of Parks for the City of Boston, 1876, City Document No. 42, p. 11.

<sup>29</sup> Ibid, p. 11.



**Figure 2-28 “Nouveau Paris Monumental” c. 1865 Illustration, E. Dufrenoy. (Figure 3, Cigliano and Landau)**

In the 1876 report, the Commissioners described park uses in very general terms. The parkways, as the connecting feature of the park system, were to: “differ from highways, by being designed with reference to recreation and ornamentation as well as traffic.... If heavy traffic is excluded, the floors of the roadways can be kept in such condition as will add greatly to the comfort and safety of driving, and do much to encourage the use of pleasure equipages. The paths will be entertaining promenades. The soft pads will renew the excellent habit of saddle exercise, which in consequence to the hard roads of the suburbs, has nearly become a lost art with the present generation”<sup>30</sup>

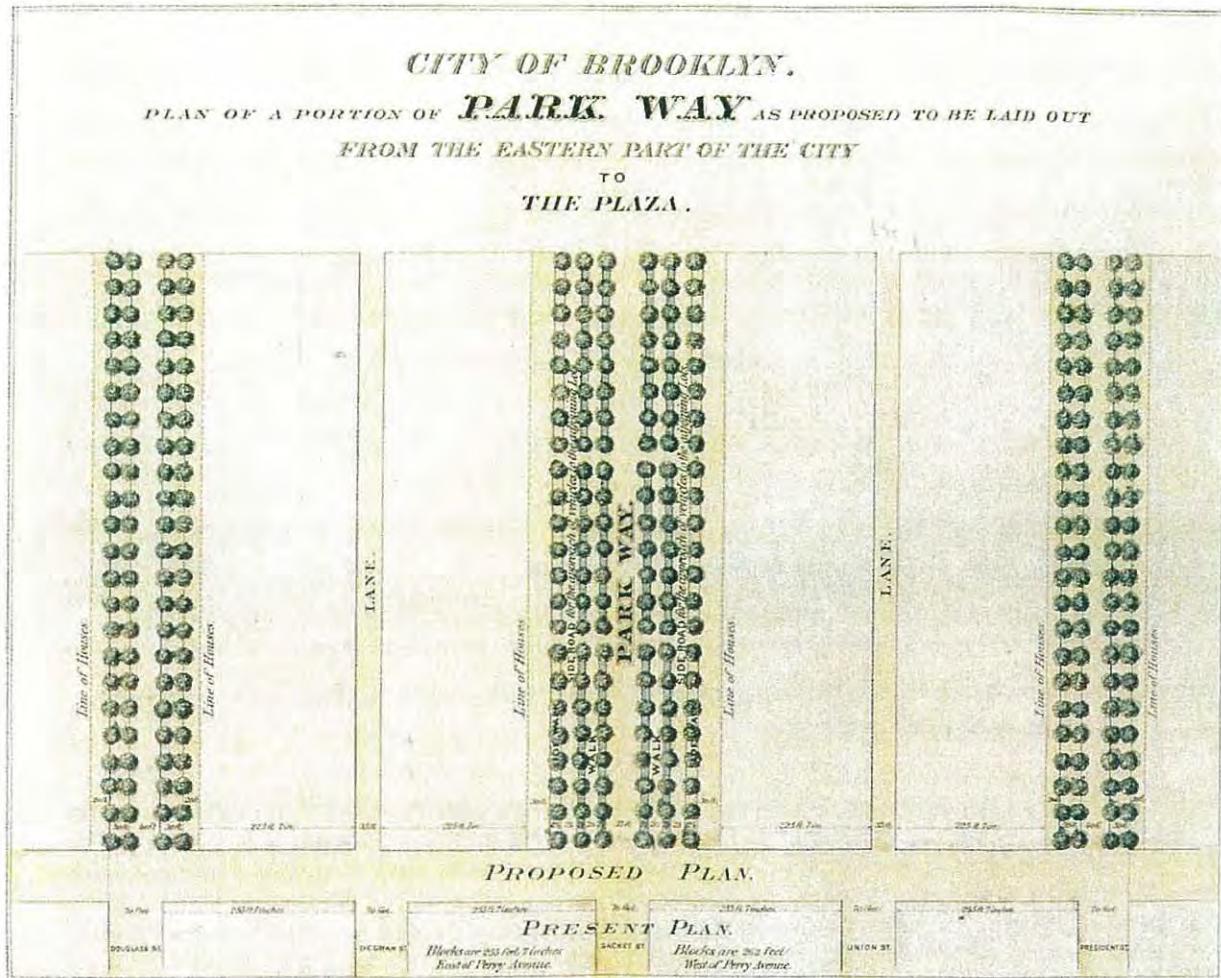
### **2.3.2 Context - Frederick Law Olmsted and the Development of the Parkway Concept:**

According to Charles Beveridge, as Olmsted developed his solution for the American metropolis, he gave distinctive form to a series of institutions. “In collaboration with Calvert Vaux he set the pattern for the urban park in America, provided, a concept and rationale for the urban park system, designed and named the parkway, and created the country’s first significant examples of greenways.”<sup>31</sup>

<sup>30</sup> “Jamaica Pond and the Arborway” (draft submission) Cynthia Zaitzevsky editor, June 1987, Department of Environmental Management, DEM Contract No. 190-85, p. I.4.

<sup>31</sup> Frederick Law Olmsted Designing the American Landscape, Charles E. Beveridge and Paul Rocheleau, Rizzoli International Publications, Inc., New York, New York 1995, p. 48.

Beveridge continues... "The most influential innovation was the parkway. As proposed by Olmsted and Vaux, it would provide a continuous public pleasure ground that kept the character of neighborhoods near it residential. Olmsted and Vaux first developed the concept in a report to the Brooklyn Park Commissioners in 1868 (Figure 2-29). They proposed a series of boulevards running through the major residential sections of the city. These parkways would connect public recreation grounds and would also extend the amenity of a parklike green space throughout the city."<sup>32</sup>



**Figure 2-29 Plan of a Portion of Park Way as Proposed to be Laid Out from the Eastern Part of the City to the Plaza, City of Brooklyn, 1868. FLONHS (Beveridge and Rocheleau).**

Olmsted and Vaux rationalized the idea of the parkway to accommodate the light spring-carriages that were becoming popular in the cities. "In order to realize its potential as a means of fast and pleasant movement through the city, the carriage needed a separate route of travel. Thus in addition to walkways, trees and shrubs, and roads on either side for heavy carting, Olmsted's parkways introduced a new element, a smoothly paved roadway in the central section for the sole use of light carriages. This roadway he termed the "park-way."<sup>33</sup>

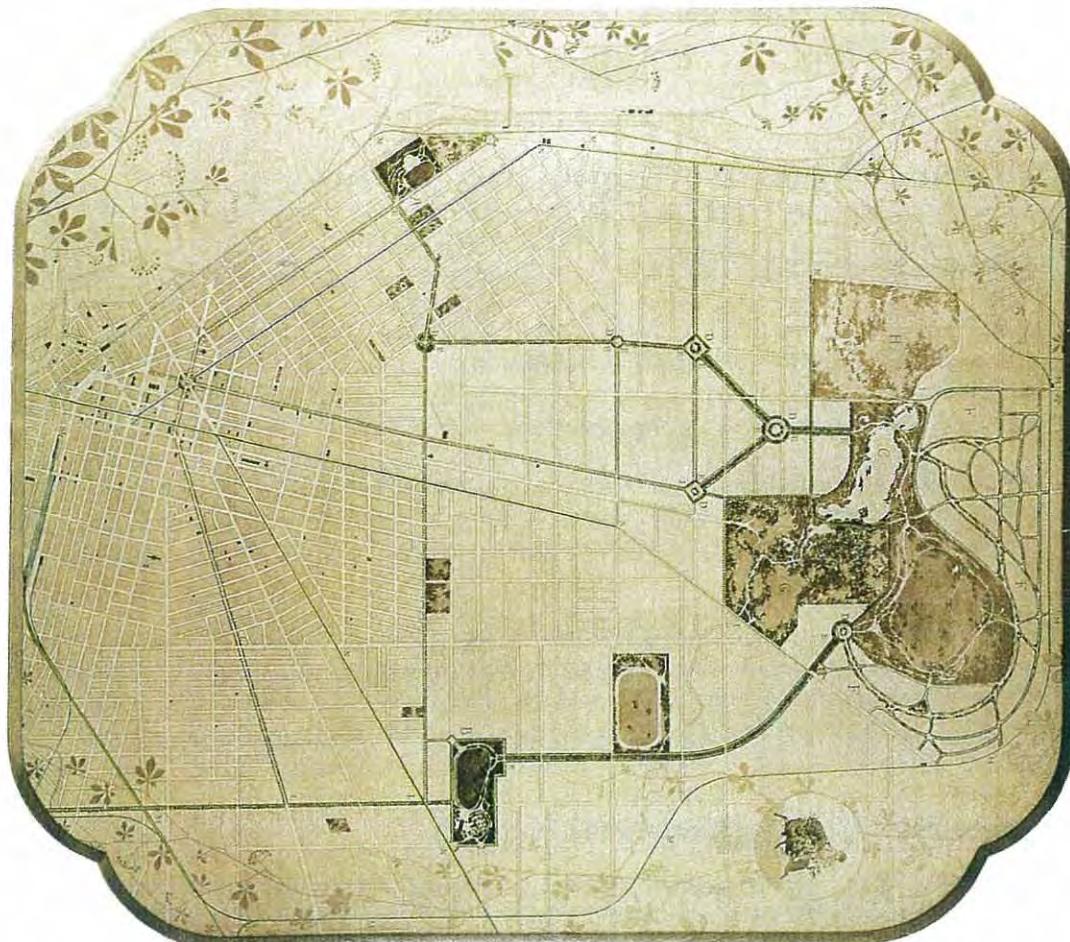
Cynthia Zaitzevsky observes, "Olmsted consistently viewed every park design as part of a comprehensive city plan. For him a park was never an ornamental addition to a city but an integral part of its fabric and a force for

<sup>32</sup> Ibid p. 48.

<sup>33</sup> Ibid p. 48.

future growth ...”<sup>34</sup> She acknowledges Olmsted’s work in Buffalo, New York as his most complete park system prior to Boston’s system of parks and parkways. “In Buffalo a like-minded group of citizens led by William Dorsheimer worked for and achieved what was certainly the most complete park system prior to Boston’s.”<sup>35</sup>

Charles Beveridge explains that “The park and parkway system planned by Olmsted and Vaux was grafted onto the original Buffalo city plan drawn up by Joseph Ellicott in 1804. Olmsted admired that plan, with its system of major streets radiating from the city center. It was a welcome relief from the usual gridiron.”<sup>36</sup> Buffalo had sought Olmsted’s advice in 1868, and by 1881 the City of Buffalo design was established (Figure 2-30). For the Buffalo design, Olmsted developed several parkways that lead from a central core to smaller public grounds.



**Figure 2-30 Buffalo Park System, 1876. FLONHS (Beveridge and Rocheleau).**

Cynthia Zaitzevsky’s research on the Boston Park System discusses the development of the parkway as an integral part of the park system. In Boston, it is not until December 1878 that Olmsted finally entered into a contractual arrangement with the Boston Park Commission, although he had been asked for advice in 1875 and his formal services were at first only for the Back Bay Park. “However, in the 1879 Fifth Annual Report, the

<sup>34</sup> Frederick Law Olmsted and the Boston Park System, Cynthia Zaitzevsky, The Belknap Press of Harvard University Press, Cambridge, MA. 1982, p. 51.

<sup>35</sup> Ibid. p. 52.

<sup>36</sup> Frederick Law Olmsted Designing the American Landscape, Charles E. Beveridge and Paul Rocheleau, Rizzoli International Publications, Inc., New York, New York 1995, p. 94.

second year of Olmsted's formal involvement with the Boston Park System, he confirmed the Commissioner's earlier description of a triad of circulation routes for carriages, saddle-horses, and pedestrians.<sup>37</sup>

Cynthia Zaitzevsky also notes that "Olmsted had particularly admired in Paris the Avenue de l'Imperatrice, which is one of the major approaches to the Bois de Boulogne. At 120 meters wide, or just under 400 feet, this avenue is almost twice as wide as Commonwealth Avenue in Brighton."<sup>38</sup> "The only place in Boston where Olmsted was able to use a comparable scheme was the Arborway..."<sup>39</sup>

Cynthia Zaitzevsky concludes her chapter on the "Emerald Necklace Completed" with an observation on the Boston parkways. "With characteristic sensitivity, Olmsted adapted the design of the parkway to the varying natural and architectural surroundings along the route. Formal and relatively flat as it passes the Fens, intimate and sylvan as it skirts the Muddy River and Jamaica Pond, and majestically ample in width as it approaches the Arboretum, the Boston parkway is one of Olmsted's grandest conceptions."<sup>40</sup>

## **2.4 Identification of Periods of Significance of the Arborway**

The **Period of Significance** of a landscape is defined by the National Park Service as the span of time for which a landscape attains historical significance and for which it meets National Register criteria. It is further defined as the meaning or value ascribed to a structure, landscape, object, or site based on the National Register criteria for evaluation and normally stems from a **combination of association and integrity**. As explained below, the Primary Period of Significance for the Arborway is the Frederick Law Olmsted, Sr. Period, 1879-1897. A Secondary Period of Significance is the Arborway's transition into automobile use, 1898-1949.

Association is the relationship between a historic event, activity, or person and the historic and cultural landscape. Association for a designed historic landscape such as the Arborway is its attribution to a designer or designers. In the case of the Arborway, Frederick Law Olmsted Sr. is credited with the original parkway layout and design.

The historical integrity is the authenticity of a historic or cultural landscape's historic identity, evidenced by the survival of physical characteristics, which existed during its historic periods. The degree of integrity is determined by the extent to which a landscape retains its historic appearance. The seven qualities of integrity (location, setting, design, materials, workmanship, feeling and association) are described in Section 3.

### **2.4.1 Primary Period of Significance (1879-1897)**

In the case of the Arborway, the Primary Period of Significance is between 1879 and 1897, the period within which Frederick Law Olmsted Sr. (1822-1903) or the Olmsted firm had direct involvement in the design and implementation of the Emerald Necklace Parks. In 1878, Frederick Law Olmsted was commissioned by the City of Boston to prepare a design for the Boston park system. Implementation of the project was begun the following year and continued with direct involvement of the Olmsted firm until 1897. In addition to Frederick Law Olmsted, Sr., John Charles Olmsted (1852-1920) was a key player in the design, picking up more of the responsibility as his father neared retirement.<sup>41</sup> Olmsted's retirement in 1895 from the profession ended his

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<sup>37</sup>"Jamaica Pond and the Arborway" (draft submission) Cynthia Zaitzevsky editor, June 1987, Department of Environmental Management, DEM Contract No. 190-85, p. I.5.

<sup>38</sup>"Frederick Law Olmsted and the Boston Park System", Cynthia Zaitzevsky, The Belknap Press of Harvard University Press, Cambridge, MA. 1982, p. 113-114.

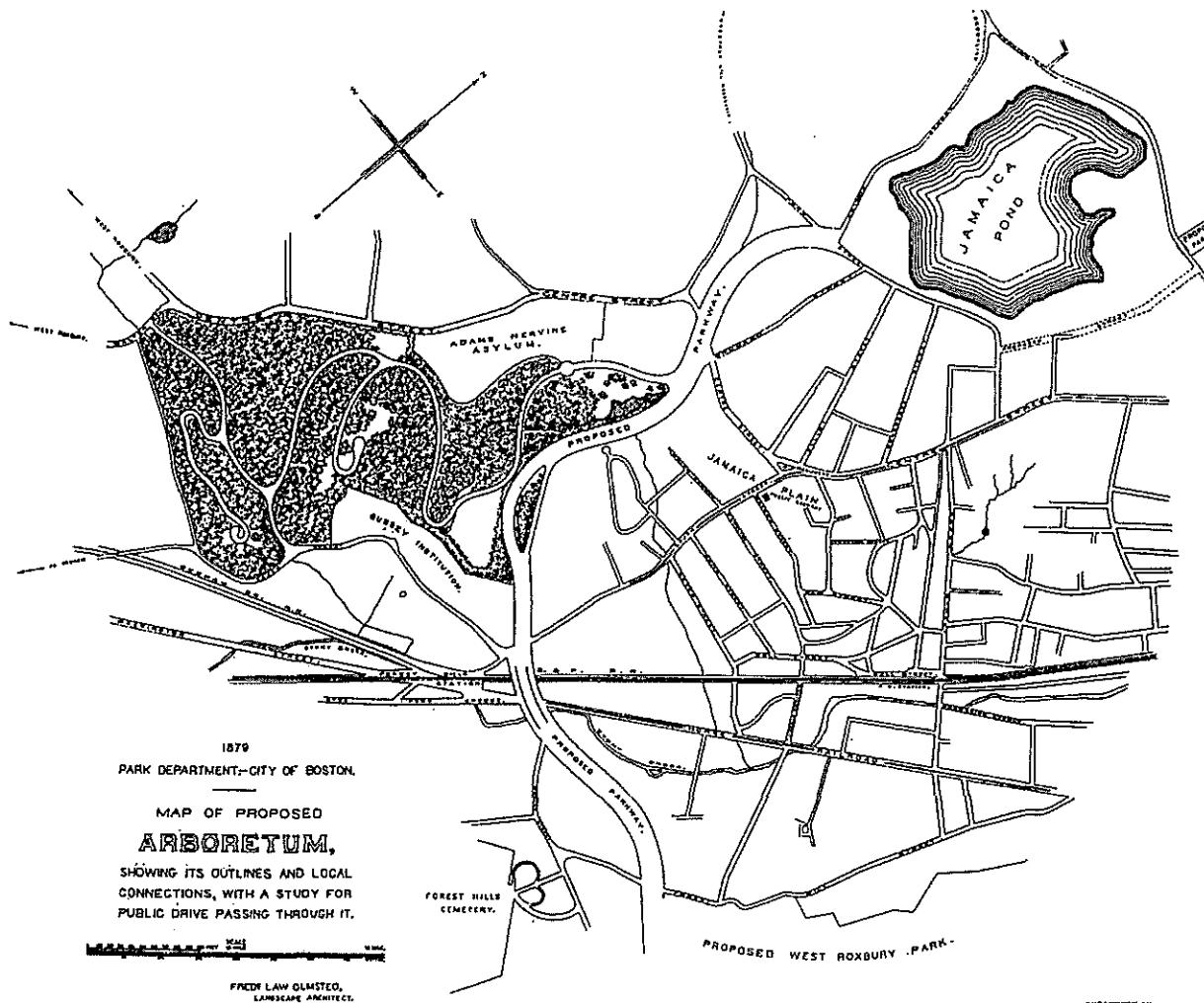
<sup>39</sup>Ibid. p. 114.

<sup>40</sup>Ibid. p. 94.

<sup>41</sup>"The Emerald Necklace Parks", Shary Page Berg, Boston Landmarks Commission Environment Department City of Boston, Landmarks nomination, p. 47.

direct involvement with the site. After 1897, implementation of the plans were under the direction of John Pettigrew, Superintendent of the Boston Parks Department.<sup>42</sup>

The design of the Arboretum and the Arborway began with the first drawings produced for the landscape, which is the 1879 plan titled “Map of Proposed Arboretum, showing its outlines and local connections, with a study for public drive passing through it” (Figure 2-31). The 1879 plan illustrates a “proposed parkway” connecting Jamaica Pond to the proposed West Roxbury Park (Franklin Park).

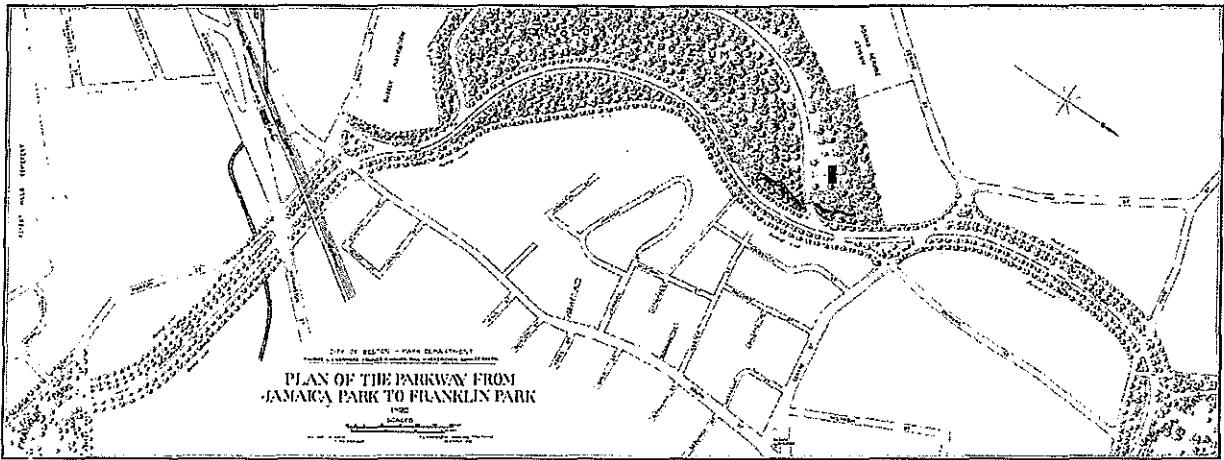


**Figure 2-31** Olmsted’s Plan for the Arnold Arboretum, 1879. Lithograph. FLONHS (Zaitzevsky)

The key drawing, however, for this period is the 1892 lithograph plan titled “Plan of the Parkway from Jamaica Park to Franklin Park” (Figure 2-32). On this plan, the parkway is labeled the Arborway and the lithograph, which was published in the 1892 Annual Report of the Board of Commissioners, is Olmsted’s design and layout of the Arborway. It is interesting to note that this particular report also contained lithographs of the park layouts for the entire park system.

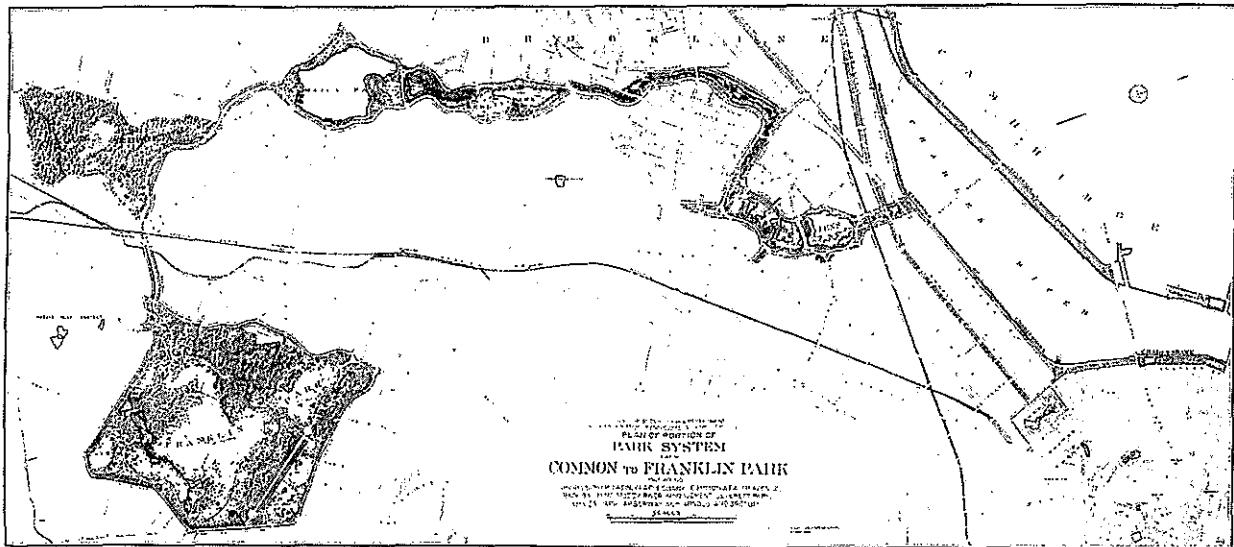
<sup>42</sup> Ibid, p. 47.

The plan not only illustrates the proposed layout of the three modes of movement Olmsted had observed in Paris (carriageway, pedestrian promenade and bridle path), but also illustrates the proposed plantings of single and in some cases double rows of large deciduous trees set in lawn.



**Figure 2-32 Plan of the Parkway from Jamaica Park to Franklin Park, December 1892**  
**Lithograph, Olmsted, Olmsted and Eliot. FLONHS, #901-55tc1.**

The last plan developed during Olmsted's involvement with the Emerald Necklace parks and parkways is the 1894 lithograph plan titled "Plan of the Park System from the Common to Franklin Park" (Figure 2-33), which illustrates the entire system of parks and parkways. The layout for the Arborway on this plan is the same layout for the Arborway on the 1892 plan.



**Figure 2-33 Plan of the Park System from the Common to Franklin Park, 1894**  
**Lithograph, Olmsted, Olmsted and Eliot. FLONHS. (Figure 1 Zaitzevsky)**

## 2.4.2 Secondary Period of Significance (1898-1949)

The Secondary Period of Significance for the Arborway is from 1898 (when Frederick Law Olmsted Sr. and the Olmsted firm no longer had input into the implementation of the construction of the Emerald Necklace Parks) to 1949, after which time design work on the road shift from the Boston Parks and Recreation Department to the Metropolitan District Commission, resulting in substantial changes and ultimately a change in ownership.

It is interesting to note that the Olmsted firm as Olmsted, Olmsted and Eliot and then as Olmsted Brothers had peripheral involvement with the Arborway landscape after 1898 as described in the chronological site history. The Olmsted firm was called in again in 1910 to evaluate the park system. John Charles Olmsted's notes from this period are a good reference on the condition of the park system in the early twentieth century.<sup>43</sup> Also in 1910, Arthur A. Shurtleff (Shurcliff), who had worked with the Olmsted firm until he started his own practice in 1904, was appointed landscape architectural advisor to the Boston Park Department. Shurtleff worked mainly in the Back Bay Fens, but was involved in the Arborway in 1925 when he prepared a plan for the design of a rotary at the Forest Hills Entrance at Franklin Park. (Figure 2-21).

It is during the Secondary Period starting in the 1920s, that the automobile emerged as the primary vehicle used on the Arborway, necessitating modifications such as rotary reconfigurations, widening of the roadway for turning lanes and the elimination of the bridle path in some areas.

During the 1950s, the automobile and increased traffic pressure dominated decision-making and design changes to the Arborway. As a result, improvements made after 1950 are not considered significant.

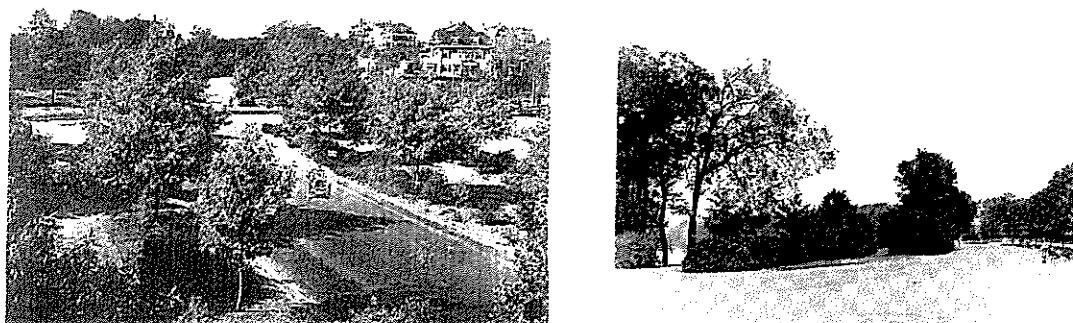
<sup>43</sup> "The Emerald Necklace Parks", Shary Page Berg, Boston Landmarks Commission Environment Department City of Boston, Landmarks nomination, p. 47.



## 3.0 Existing Conditions – Historic Landscape & Integrity Analysis

### 3.1 Description of the Arborway Parkway Landscape

The following is a description of the Arborway, a 1.5-mile long segment of Boston's Emerald Necklace park system. Frederick Law Olmsted, Sr. originally designed the Arborway, which connects three of Boston's major parks: Jamaica Pond, Arnold Arboretum, and Franklin Park. At its northern end, the Arborway connects to the Jamaicaway (another component of the Emerald Necklace), adjacent to Jamaica Pond. The Arborway runs principally north – south through most of the study area, though it curves to run east west as it passes the Arnold Arboretum and the Forest Hills MBTA station. In the Forest Hills area, the Casey Overpass carries the roadway through the historic Arborway alignment. The Arborway ends at Shea Circle, adjacent to Franklin Park (Figure 3-1).



**Figure 3-1a & 3-1b** (a) Arborway Looking West From Forest Hill, Thomson & Thomson, no date, SPNEA; (b) Parkway at Jamaica Pond, H. Perkins, September 1916, FLONHS #920-75.

**Arborway Between Kelley Circle and Murray Circle:** In this section, the Arborway comprises three roadways, separated by two wide, tree-lined medians. The Inner Arborway has two lanes in each direction, while the Outer Arborway has two lanes running northbound and two lanes running southbound. This segment of the Arborway therefore has four lanes in each direction, compared to two lanes in each direction in other sections of the Emerald Necklace parkway system. Houses with driveways are situated directly on the Outer Arborway roadways.

**Arborway Between Murray Circle and South Street:** This section of the Arborway extends from the Arnold Arboretum on the west side to the Jamaica Plain residential neighborhood on the east. The Arborway mainline is median-separated, with two lanes in each direction. Directly east of the Arborway mainline is the Upper Arborway, a parallel roadway with homes on the eastern side of the street.

**Arborway and the William J. Casey Overpass Between South Street and Shea Circle:** As the Arborway approaches South Street, the grade descends sharply. Route 203 continues eastward from the Arborway by means of the Casey Overpass, which spans South Street, the northern end of Forest Hills MBTA station, and Hyde Park Avenue. The Casey Overpass then returns to the ground plane at Shea Circle. The Arborway proper connects to the at-grade roadways via ramps that connect to South Street where it aligns with the southerly segment of Washington Street. The Arborway proper is then discontinuous for the width of the Forest Hills Station, between South Street / Washington Street and Hyde Park Avenue / Washington Street. The surface roadway in this segment of the Arborway corridor is New Washington Street. The Arborway proper then continues between Hyde Park Avenue / Washington Street and Shea Circle. In this section, the Arborway is a pair of one-way surface roadways: the eastbound Arborway is directly north of the Casey Overpass, adjacent to the MBTA's 500 Arborway and Arborway Yard facilities, and the westbound Arborway is directly south of the Casey Overpass, adjacent to the West Roxbury Courthouse.

## 3.2 Existing Conditions Inventory and Assessment of Character-Defining Features

### 3.2.1 Features Associated with the Primary Period of Significance.

The existing conditions inventory and documentation identified landscape characteristics that define the existing appearance and character of the Arborway landscape. These characteristics were identified and documented during field surveys and were completed in 2003.

Using the NPS definitions for both character-defining features and landscape characteristics, the following analysis of the Arborway identifies extant characteristics associated with the Primary Period of Significance (1879 – 1897) that contribute to the integrity and significance of the parkway. The analysis of integrity will determine the degree to which the parkway evokes its historic appearance, including an evaluation of both contributing and non-contributing resources.<sup>1</sup> The character-defining features for the Arborway are:

**Spatial organization:** The spatial organization of the parkway was established in the Primary Period as a linear curving roadway with regularly-spaced, parallel rows of trees bordered by a pedestrian walk on both sides, which also featured parallel rows of trees. The bridle path was created as a separate circulation system, running continuously from Jamaica Pond to Franklin Park. Although the bridle path followed a course parallel to the other circulation routes, its alignment was not always in a consistent location in relation to them. The spatial organization is a primary character-defining feature and is a contributing feature.

The spatial organization remains largely intact from the Primary Period of Significance, although the bridle path and portions of the pedestrian walk are not extant. The curving alignment remains, except at the three rotaries, Kelly Circle, Murray Circle and Shea Circle, and at the Casey Overpass. The parallel rows of trees are a discernible feature, although individual trees are missing in a few areas, and the parallel lines of trees have been lost at the three rotaries and the Casey Overpass.

**Land Use:** The Arborway's function as a scenic parkway connecting two parks Jamaica Park and Franklin Park and the Arnold Arboretum within the Emerald Necklace park system was established in the Primary Period. During the late 19<sup>th</sup> Century, it was a pleasure drive within a park system on which travelers traversed in horse drawn carriages or on horseback at a moderate to slow speed. The parkway not only connected public recreation grounds, and the Arboretum, but it also extended the green space, forming connector between parks.

The land use as a scenic parkway remains in part from the Primary Period of Significance. Although the Arborway is no longer a scenic parkway as Olmsted envisioned it, and is now a major commuter route that handles larger volumes of traffic at a faster rate of speed in modern vehicles, it still provides a green connector between the aforementioned parks, creating a scenic driving experience.

**Circulation:** The circulation system was established as an integral part of the parkway's design in the Primary Period. As described under the spatial organization above, Olmsted designed the parkway as a triad of circulation routes for carriages, saddle-horses, and pedestrians within a curvilinear road system. The separation of the three different modes of movement is a primary characteristic of the historic design.

The circulation system and the Arborway road alignment remains partially intact from the Primary Period of Significance with alterations noted as follows:

<sup>1</sup> Contributing resources differ from character-defining features in that they are generally more substantial in size and meet the guidelines established by the National Register of Historic Places. Both contribute to the integrity of the property and should be considered in management, maintenance, and design decisions. Landscape characteristics are the “tangible and intangible characteristics of a landscape that individually and collectively give a landscape character and aid in understanding its cultural value” (National Park Service, Landscape Lines #3, 1999). Character-defining features or landscape characteristics are considered to contributing if they remain largely intact from the period of significance.

- In 1953, the City constructed the Monsignor William J. Casey Overpass between the Forest Hill entrance to the Arnold Arboretum and the entrance into Franklin Park at Shea Circle;
- The street widths have been widened in selected areas particularly at intersections to allow for turning lanes;
- Kelley Circle created in 1943 with modifications to Jamaica Pond Park
- Murray Circle created in 1932; and
- Modifications to Morton Street in 1925, Shea Circle in 1953, and the Franklin Park entrance accommodate the Casey Overpass.

The separation of ways (footpath, carriage path or the street, and the “ride” or bridle path) remains only in part, since “the ride” has been removed as have areas of sidewalk. The main north entrance (Jamaica Plain Gate) at the Arnold Arboretum retains its historic character, while the south (Forest Hills) gate is only partially intact. The Franklin Park entry at Shea Circle has been altered substantially since the Primary Period of Significance.

**Topography:** The topography of the parkway was established in the Primary Period. The parkway as originally designed responded to the grades of the adjacent parks and residential properties. The topography is a character-defining feature of the Arborway landscape. These grades retain their form and character from the Primary Period of Significance, except for the altered section between the Forest Hill entrance to the Arnold Arboretum and the entrance into Franklin Park at Shea Circle now the Monsignor William J. Casey Overpass (1953). In this section, the elevation of the roadway has been raised above the original roadbed of the parkway and therefore is a non-contributing feature.

**Vegetation:** The design element of parallel rows of trees to separate the circulation routes of the parkway was established in the Primary Period, but the actual species of tree planted and the under-plantings of shrubs in selected areas were established in the Secondary Period (1898-1949). The parallel rows of trees are a primary character-defining feature, which define the spatial organization of the Arborway and contribute to its character and significance as a green connector and scenic parkway. As originally designed they are shown as regularly spaced parallel rows of trees that define the separate ways and provide a high canopy that shades the circulation routes and creates a verdant middle ground between the roads and paths and adjacent land uses.

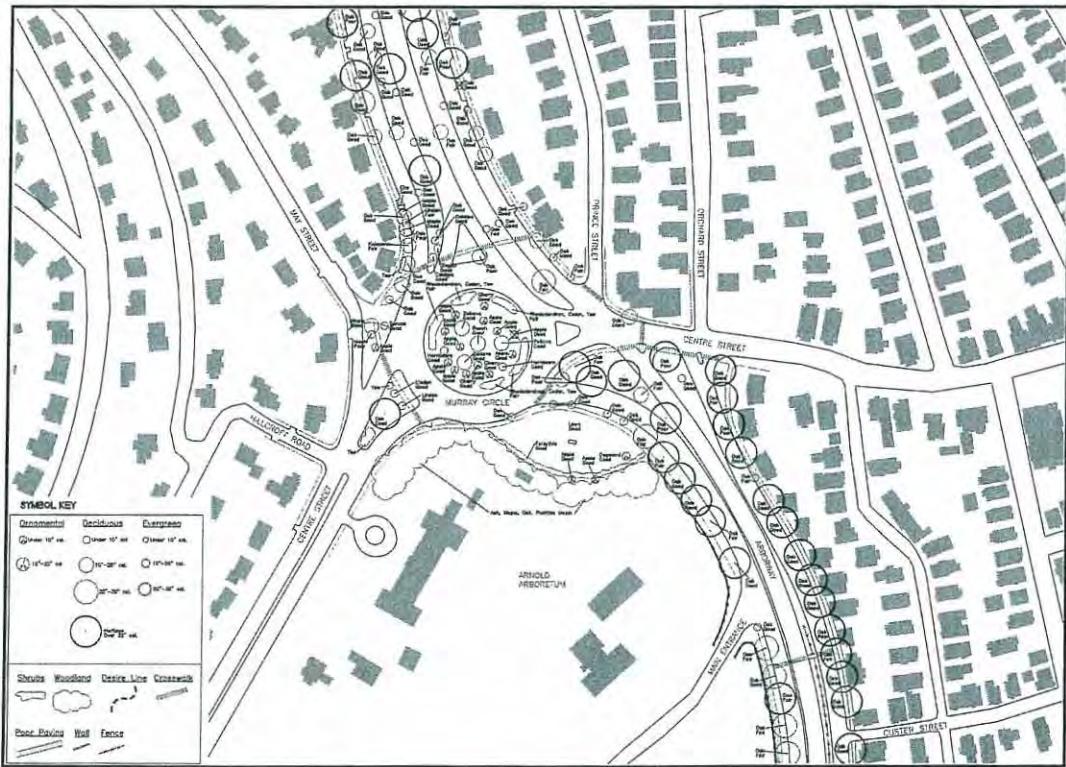
Finally planted in 1898, after Frederick Law Olmsted Sr.’s and the Olmsted firm’s involvement in the design of the Arborway, the parallel rows of trees were planted as a monoculture of *Quercus rubrum*, or Red Oak. In 1897, the Parkways were still under construction and when the trees (Red Oaks) were planted they were placed in the ground as one continuous line or allee of a single species from Franklin Park to Huntington Avenue. For this reason, the concept of rows of trees to define and separate the circulation ways illustrates the design concept developed during the Primary Period, but the species actually planted (Red Oak) is representative of the Secondary Period. This character-defining feature is largely intact with the exception of the introduced Ginkgo trees. The avenue trees and shrub plantings in areas below or adjacent to the traffic circles have been altered since both the Primary and Secondary Periods of Significance.

The analysis of existing vegetation is documented on the Existing Conditions and Analysis Drawings (Figures 3.2 through 3.6). In accordance with the Commonwealth of Massachusetts Department of Environmental Management standards, trees that are 32" inches in caliper or greater are considered to be heritage trees and are labeled as such. All trees, including the heritage trees, have their species and caliper size identified and the condition of the trees is rated as good, fair or poor. The diameter of the circle for tree canopy shown on the drawings is in relation to its caliper size.

The tree plantings are partially intact from the Primary Period of Significance for they are no longer a true parallel row of trees for the entire length of the parkway. The shrub plantings associated with the Secondary Period are no longer extant.



**Figure 3-2 Existing Conditions and Analysis for the Arborway – Kelley Circle**



**Figure 3-3 Existing Conditions and Analysis for the Arborway – Murray Circle**

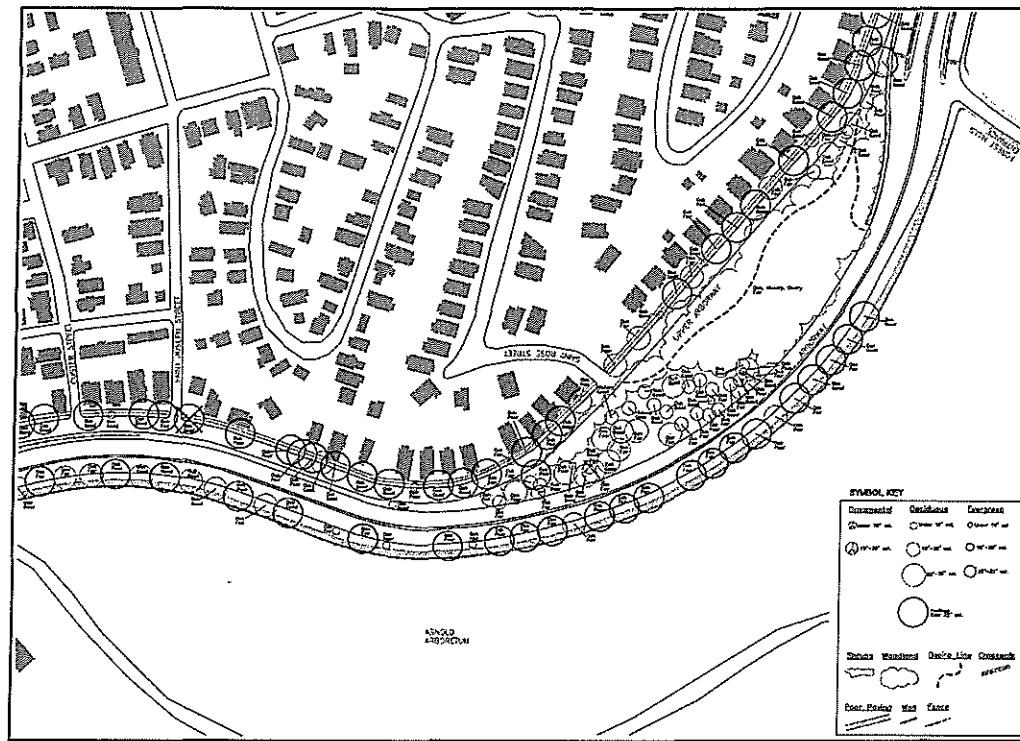


Figure 3-4 Existing Conditions and Analysis for the Arborway – Arnold Arboretum

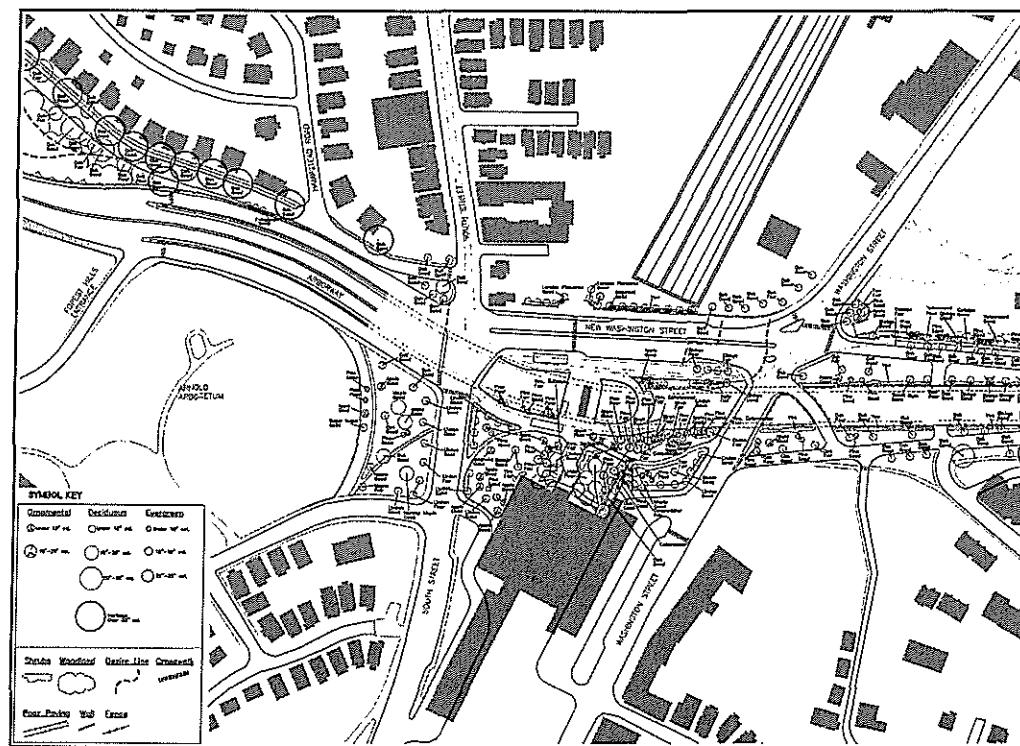


Figure 3-5 Existing Conditions and Analysis for the Arborway – Casey Overpass and Forest Hills

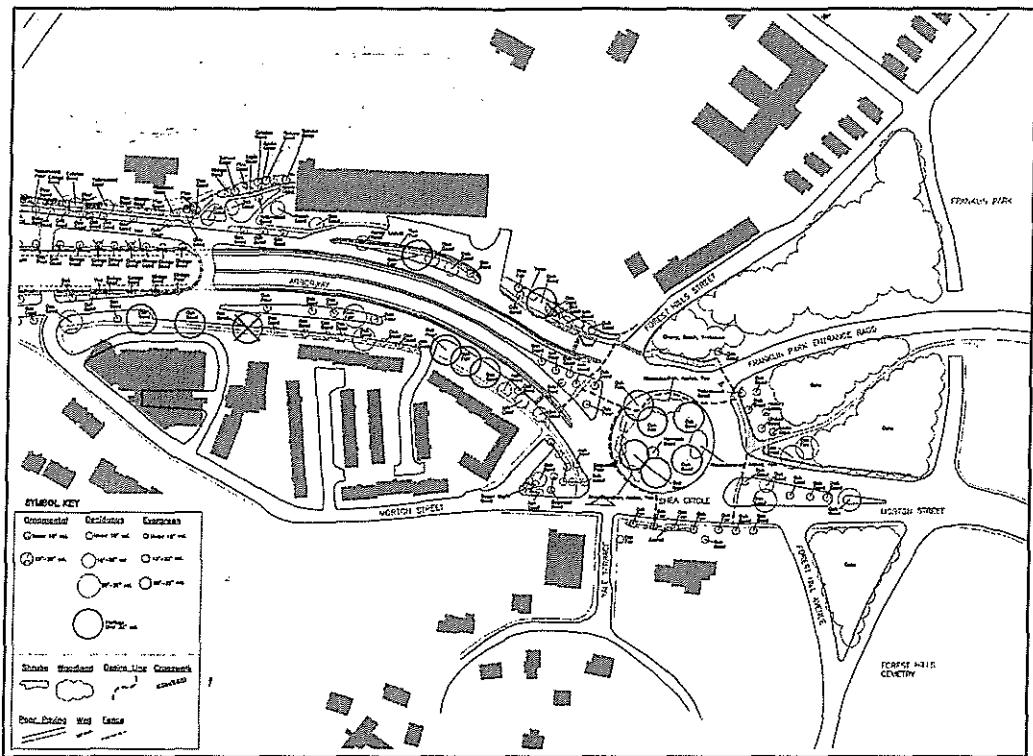


Figure 3-6 Existing Conditions and Analysis for the Arborway – Shea Circle

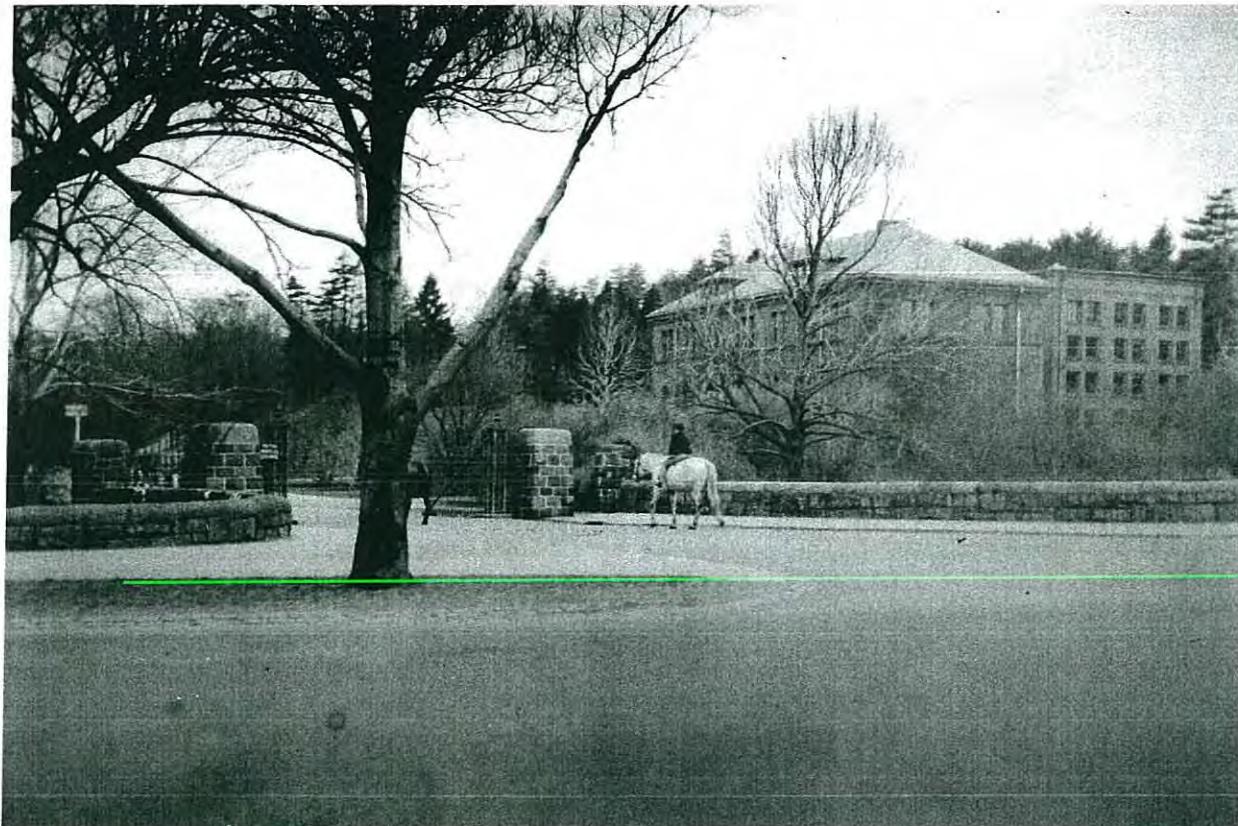
**Buildings and structures:** The parkway landscape, as historically designed and constructed, did not contain buildings and structures during the Primary Period. Therefore, this is not a character-defining feature. The adjacent walls and gates at the Arboretum are outside the study area and were part of the separate project related to the Arboretum design and not the parkway (Figure 3-7). These walls are visible from the Arborway, and they likely contribute to the significance of the Arboretum.



Figure 3-7 Parkway looking from Prince Street showing wall, curb, and planting, no date, FLONHS.

**Views and Vistas:** The views and vistas from the parkway were established in the Primary Period, but were limited in number. The original Olmsted design included a few selective views and vistas, such as:

- A vista across Jamaica Pond at the junction of the Jamaicaway and the Arborway at Parkman Drive,
- A view of the Franklin Park entrance at Forest Hills Street now Shea Circle, and
- A view of the main entrance (Jamaica Plain Gate) of the Arnold Arboretum at Centre Street/Murray Circle (Figure 3-8).



**Figure 3-8      Arboretum Main Entrance and Parkway, no date, FLOHNS, #902 Arnold Arboretum series.**

The major view established in the Primary Period was the “avenue effect,” or the view along the continuous linear curving triad of circulation systems within the parallel rows of trees (Figure 3-9). Generally, the views and vistas from and along the parkway retain their historic character. The exception is the partial loss of the avenue effect opposite the Arboretum along the residential side, and the complete loss of the avenue effect due to the construction of the Casey Overpass.



**Figure 3-9 Jamaicaway at Prince Street showing ride, drive-way and plantings, no date, FLONHS.**

**Small-scale features:** Evaluation of small-scale features is not applicable, because lighting, benches, or trash receptacles were not historically included in the Olmsted design and therefore were not established during the Primary Period of Significance. The parkway was a movement system; benches or settees were reserved for the park areas and trash receptacles were not in use in the parks before 1898. To date, no documentation has been found to accurately identify the age of the current lighting along the parkway, but park reports during the Olmsted period make no mention of lighting design. The only documented lighting for any of the Emerald Necklace parks are lighting plans and extant relics at Olmsted Park, photographic documentation for the Fenway Parkway, photographic documentation at Jamaica Pond (Figure 3.10), and photographic documentation at the viaduct. The photographic documentation for the Jamaica Pond area and the viaduct is the “Bishops Crook” light, not the current MDC standard parkway pendant light. Lighting was, therefore, established as a continuous feature along the parkways during the Secondary Period.



**Figure 3-10** Jamaica Park showing light fixture, FLONHS #920-40.

The roadways as originally constructed during the Primary Period were crushed stone covered with a coating of binding gravel of screenings from the crushed stones. The gutters were paved with cobblestones in the Arboretum, but with granite blocks in Franklin Park. No documentation has been found to document the specific type of paved gutter installed for the Arborway. During the Primary Period, the medians were limited to grass and trees and no mention is made of any edge treatment, likely because at the time of the layout of the parkways during the Primary Period, automobiles had not yet been developed.

The parks reports address roadway repairs, including resurfacing and oiling for the suppression of dust, but did not mention curbing. They also did not distinguish between the material used for the roadway and the material used for the shoulders, except for identifying paved gutter for drainage. The first mention of bituminous material for roadway surfacing in the Arborway was in the Fifty-second Annual Report in 1927, when the Arborway between Prince Street and Centre Street was paved with “bitulithic pavement” as part of the policy to construct permanent pavements on parkways and boulevards within the city. The Annual Report does not mention curbs or concrete sidewalks, but photographic documentation exists of curbing along Prince Street.

The 1889 Fifteenth Annual Report of the Boston Park Commissioners does not mention shoulder materials and curbing, or what they at this time called edgestone. This report mentioned that in Franklin Park “Glen Lane (for heavy traffic) has been graded, macadamized, and furnished with edgestones and gutters”. Documentation has not yet been found to sufficiently date the introduction of granite curb, traffic signage, or traffic lights on the Arborway. None of these features were documented in the parks reports or could be found in the photographic documentation for the Primary Period of Significance. Photographic documentation during the Secondary Period does show curbs on the medians that may have been added when the trees were planted in 1898, but curbs do not appear along the park edges. Cubing on the medians existed during the Secondary Period, but it is difficult to date the curbs as original since they have been modified repeatedly.

The bridle path was described in the 1911 Thirty-sixth Annual Report of the Board of Commissioners as “a soft loamy sand surface suitable for horseback riding, especially at a speed greater than a walk.” This report also depicted the bridle path “as an attractive bridle path from the Fens at Boylston Street to the Playstead in Franklin Park”. Along the Arborway, the bridle paths are not extant and are therefore not a character-defining.

The footpaths or what are now concrete sidewalks along the Arborway were not discussed in the parks reports. However, the 1887 Thirteenth Annual Report of the Boston Park Commissioners reports that “a stone-crushing plant was purchased, and this has crushed all the stone used for surfacing the drives and walks.” Within the Emerald Necklace parks, footpaths were originally crushed stone. None of the crushed stone paths are extant within the Arborway. In addition, it is not possible to date the introduction of the concrete sidewalks, other than to know they were installed after the Primary Period.

### **3.3 Statement of Integrity**

The physical evidence presented in the analysis drawings, along with the photographic record, text descriptions, and historic documents form the basis for the following discussion of the integrity of the Arborway landscape. Historic integrity is defined as “the authenticity of a property’s historic identity, evidenced by the survival of physical characteristics that existed during the property’s historic period.”<sup>2</sup> There are seven qualities of integrity; location, design, setting, materials, workmanship, feeling and association. In this analysis, integrity is evaluated related to the Primary Period of Significance (1878-1897).

The questions to be answered in discussing the integrity of the Arborway landscape are drawn from *National Register Bulletin #18: How to Nominate Designed Historic Landscapes*. Stated in terms relevant to the Arborway, they are:

- To what degree does the Arborway convey its historic character as a parkway connecting parks within a park system? Is it still a green connector?
- To what degree has the original fabric of the Olmsted parkway landscape remained to the present day?
- Are changes in the landscape irrevocable or can they be corrected so that the parkway retains integrity?

The basis for the evaluation of integrity is the deciphering of identifiable components and landscape characteristics of the original design. The existing conditions inventory and assessment of character-defining features is presented to reveal these identifiable characteristics including the continuity of spatial organization, land use, circulation, topography, vegetation, views and vistas and small-scale features. Buildings and structures are not addressed, because they are not contributing. The condition and authenticity of these features all affect integrity, expressed in the seven qualities summarized in Table 3.1.

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<sup>2</sup> *National Register Bulletin 16A: How to Complete the National Register Registration Form*, U.S. Department of the Interior, National Park Service, Interagency Resources Division, 1991, p. 4.

**Table 3-1 Summary of Landscape Integrity for the Arborway**

Aspects of Integrity	Primary Period of Significance (1879-1897)	Secondary Period of Significance (1898-1949)
<b>Location</b>	Retains location	Retains location
<b>Design</b>	Retains partial design: The separation of three circulation systems has been partially lost, as have some of the parallel rows of trees, but otherwise the Arborway design is largely intact	Retains design: During the Secondary Period, the parkway was adapted for automobile use, including the Kelley and Murray circles. Red Oaks were introduced in 1898 and many, though not all, remain. New additions, such as the Casey Overpass, compromise the historic character in some areas.
<b>Setting</b>	Setting altered: The evolution of the city and adjacent neighborhoods creates a geographic context that is more urban than existed in 1897. However, the parkway as a green connector between parks remains intact.	Retains setting: Though the city and neighborhoods continue to develop during the Secondary period, the Arborway setting is still identifiable.
<b>Materials</b>	Diminished materials: Surface materials altered for automobile use.	Materials altered: Parallel rows of Red Oaks were planted in the Secondary Period instead of Olmsted's recommended diversity of shade trees, some of which are missing. Shrub massing are also missing. New additions, such as the Casey Overpass added after 1949, compromise the historic character in some areas.
<b>Workmanship</b>	Diminished workmanship: Curvilinear alignment remains largely intact.	Diminished workmanship: Curvilinear alignment remains largely intact, although soft edges with profuse plantings have been lost.
<b>Feeling</b>	Diminished feeling: Evident but diminished due to change in use from a scenic pleasure drive to a major transportation corridor, along with the loss of trees.	Altered feeling: The rate and volume of traffic flow has grown substantially, necessitating traffic improvements that diminish the scenic roadway feeling.
<b>Association</b>	Retains association: Arborway is still associated with the Emerald Necklace Park System. Most, though not all, of Olmsted's design intentions remain. Association with the Primary Period of Significance is retained.	Retains association: Association with the Secondary Period of Significance is retained.

When taken as a whole, the parkway landscape retains its original design intent, spatial relationships, historic character and land use as a parkway connecting parks within the Emerald Necklace park system. Even with the loss of the bridle path, the sense of a scenic roadway with parallel circulation remains, so that the Arborway retains sufficient integrity to be significant during both the primary and secondary historic periods. This loss, however, is not irrevocable and it is proposed within this report to be corrected with the development of the bikeway as the bridle path.

The circulation system, therefore, remains largely intact, except of course for the portion of the parkway that has been replaced by the Casey Overpass. This is incompatible addition is no small issue, but the removal of the Casey Overpass, even though possible, would not sufficiently carry the current volumes of traffic that utilize the parkway system. As mentioned above, the proposal to provide a bikeway in place of the bridle path will again provide three separate circulation routes, within a curvilinear road system, which will re-establish the original design concept for the parkway. The character of the area below the overpass can also be improved with pedestrian and bikeway circulation and plantings in keeping with the original design intent.

Considerable historic vegetation has been retained as evidenced by the large number of heritage trees. The policy of tree replacement with the same species in exact or nearby locations has contributed to the retention of one of the most critical features of the Arborway - the parallel rows of trees. Only one area, near the MBTA Station, has not followed this practice, resulting in the area planted with Ginkgo trees. Some trees are missing, but this loss is not irrevocable and it is proposed within this report to be corrected with the addition of tree planting that is compatible with the historic character.

There are two small-scale features - the curbs on the medians and parkway lighting, for which some historic documentation exists, although the lights are not extant and it is difficult to date the curbs as original since they have been modified repeatedly. Limited documentation exists for lighting on the Arborway in the area of the railroad viaduct, but good photographic evidence exists for the adjacent Jamaicaway. Existing lighting on the parkway could be replaced with a period fixture in the same design vocabulary as the original Jamaicaway lighting in order to enhance the historic character.

The Arborway has not been compromised by irrevocable changes. While there have been some additions and losses to the parkway, they do not significantly compromise the integrity of the whole landscape. In addition, these losses and accretions may be reversible, which would allow for further improvement the Arborway's historic character.

### **3.3.1 Threats to Historic Character and Integrity**

As part of the analysis of the character-defining features, the Arborway Master Plan also assesses conditions that could threaten the integrity of the Arborway as an historic landscape in the future. The Arborway faces several possible future threats:

1. A major threat to the integrity of the parkway is the future possibility that the merger of the Metropolitan District Commission and the Department of Environmental Management into the Department of Conservation and Recreation (DCR) could result in the parkways being turned over to the Massachusetts Highway Department. The Arborway is part of a major commuter route and the standards to be met for highways are very different from the standards that govern parkways. Adapting the Arborway to highway standards could have an adverse effect on its integrity.
2. The Arborway has experienced significant change in its use, in terms of the type of vehicle, type of user and trip purpose, and volume of use. Commuter automobile use currently dominates the Arborway, and traffic volumes have increased dramatically. These increases have leveled off in recent years as congestion has increased and the traffic volumes on the parkway approximate its capacity. However, continued increases in traffic volumes, coupled with potential external factors, such as traffic diverting to the Arborway from Centre Street due to the restoration of the Forest Hills Green Line trolley service, could potentially overwhelm the parkway's ability to accommodate the traffic.
3. As the volume of traffic increases, additional congestion could cause the City to desire a new alignment. As in the past, the new engineering alignments will increase lane widths or add travel or turning lanes while decreasing green space in order to accommodate increased volumes. As the parkway becomes wider and as lane widths increase, speed will also increase, which will impact the adjacent residential uses, the bikers, the pedestrians and the trees, which line the parkway.
4. There has not been a structured program for replanting the trees that line the parkway, nor an organized routine maintenance program. As the parkway continues to age, there will continue to be loss of these trees and the parkway vistas they frame. Loss of the parallel rows of trees will greatly diminish the integrity of the parkway, because it will lose its verdant character, an essential design concept.
5. The loss of parkway views and vistas also threatens the Arborway's integrity. The principal views described above (Jamaica Pond, Arnold Arboretum and Franklin Park) should be preserved through appropriate maintenance and long-term planning and design strategies that enhance the visual experience in these locations. Views along the parkway created by the avenue effect are dependent on the preservation of the Arborway alignment and the parallel rows of Red Oaks. Thus, the preservation of a tree-lined scenic roadway is essential to the character and integrity of the Arborway.
6. Failure to adequately institute and maintain Best Management Practices (BMPs) could result in increased sand and/or salt accumulation that would threaten the adjacent vegetation. Roadways and associated drainage structures should be properly maintained and monitored, without excessive use of chemicals.
7. Lastly, the addition of new, incompatible features such as inappropriate plantings, lighting and/or signage threatens the integrity of the Arborway, and could greatly alter its character. New features or the replacement of deteriorated features can be and should be accommodated provided they are compatible in design, scale, and materials. In the future, all new additions should meet the Secretary's Standards for Rehabilitation.

## 4.0 Existing Conditions – Transportation

The following is a discussion of the Arborway's existing transportation conditions. It includes a description of the Arborway corridor's principal transportation features, the key transportation issues throughout the corridor, and the usage patterns of the transportation by the various major transportation modes in the study area: pedestrian, bicycle, and motor vehicle. This analysis of existing transportation conditions is based on comprehensive data gathering and field reviews of transportation patterns.

### 4.1 Arborway Transportation Features and Key Issues

The current design of the Arborway has been determined by the original Frederick Law Olmsted design of the parkway, combined with the subsequent changes to that design. In turn, the current design of the Arborway, combined with the region's development patterns and the rest of the transportation network, have shaped the transportation conditions along the Arborway.

The Arborway Master Plan study area intersections are shown in Figure 4-1.

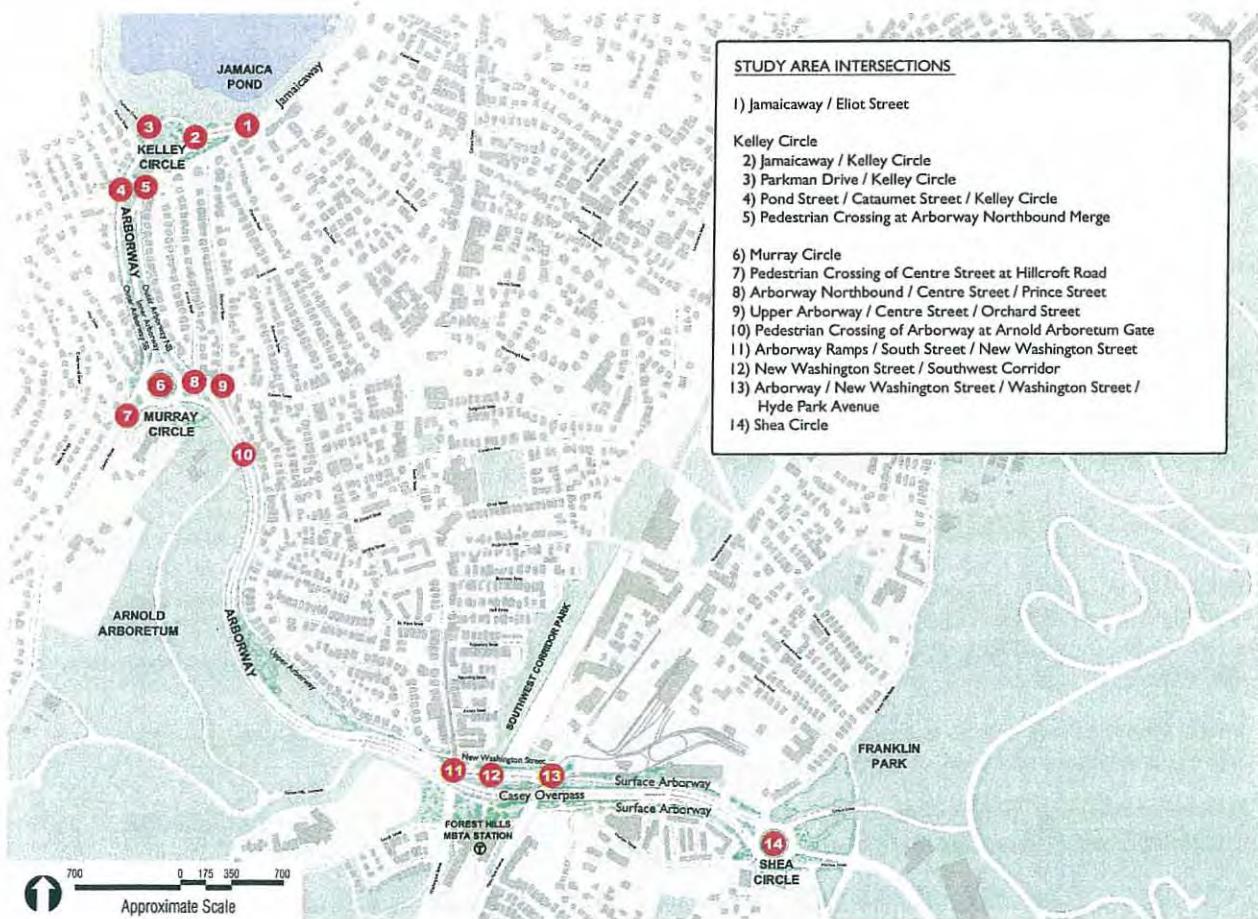


Figure 4-1 – Study Area Intersections

The following is a description of the major intersections and principal segments of the Arborway between its northern end at Jamaica Pond and its southern end at Franklin Park. This discussion identifies the transportation features of the corridor, the traffic controls at each location, and the critical transportation issues throughout the Arborway.



Figure 4-2 – Kelley Circle Area

- I. **Jamaicaway / Eliot Street.** This intersection is located near the southern end of the Jamaicaway. This intersection is a very desirable crossing point for pedestrians and bicycles headed to and from Jamaica Pond. However, there is no pedestrian signal at this location to provide a protected crossing, and pedestrian sight lines are poor, especially from the southern (Eliot Street) side of the crossing.

**Kelley Circle.** Kelley Circle is located at the southern end of Jamaica Pond, where the Jamaicaway meets the Arborway. Kelley Circle accommodates the northbound and southbound through-movements of the Emerald Necklace parkway system, as well as major turning movements to and from Parkman Drive and Pond Street. Kelley Circle is a large, oval-shaped rotary, with a large central island that is planted with many trees, including a number of red oaks that are most likely from the Olmsted design period. The following are the central transportation issues at Kelley Circle.

- Kelley Circle covers a large area and does not function like a conventional “yield on entry” rotary. As a result, drivers, pedestrians and bicyclists can become confused.
- Pedestrian crossings around Kelley Circle can be difficult due to high vehicle volumes, high vehicle speeds, and the failure of many drivers to yield to pedestrians at crossings.
- Pedestrian circulation around Kelley Circle can be indirect and circuitous. The only signal-protected crossings around Kelley Circle are at the merge of Outer Arborway Northbound / Inner Arborway and at Pond Street / Kelley Circle. The Parkman Drive approach to Kelley Circle is an important pedestrian desire line, and it is signed as a pedestrian crossing, but vehicle speeds are high and driver compliance is low.
- Bicycle riding through the rotary can be difficult due to high vehicle speeds and high speed weaving across the outer lane of the circulating roadway, where bicyclists ride.
- Cars park illegally within Kelley Circle, at the northern end adjacent to Jamaica Pond.

- Kelley Circle's inner island has a large green space that is unusable because no safe pedestrian access is provided.
- Existing road signs are too small and inadequately placed to guide drivers through Kelley Circle, resulting in confusion for unfamiliar drivers.

Kelley Circle does not function like a rotary due to its large size and varied traffic controls. Only one approach, Jamaicaway southbound at Kelley Circle, functions like a standard “Yield on entry” rotary. The other major approaches are either STOP controlled, signalized, or the entering traffic has the right of way over the circulating traffic. Therefore, Kelley Circle can be considered as four separate intersections:

2. **Jamaicaway / Kelley Circle.** The Jamaicaway / Kelley Circle intersection functions as a standard “Yield on entry” rotary approach, with Jamaicaway southbound traffic yielding to circulating Kelley Circle traffic. Northbound Kelley Circle has three lanes as it approaches the Jamaicaway leg at the northern end of Kelley Circle. The northbound traffic then splits between northbound through-traffic, which bears right onto the two-lane northbound Jamaicaway, and the traffic that bears left around Kelley Circle, most of which is bound for Parkman Drive.
  - The high-speed northbound traffic rounds a curve as it exits Kelley Circle via the Jamaicaway. This presents sight distance problems for pedestrians and bicyclists attempting to cross to Jamaica Pond at Eliot Street, a highly desirably crossing location.
  - Northbound Arborway to Parkman Drive traffic is a high volume move, especially in the morning peak hour. This movement hampers the ability of Jamaicaway southbound traffic to enter Kelley Circle.
3. **Parkman Drive / Kelley Circle.** Beyond the Kelley Circle – Jamaicaway merge, traffic bound for northern Brookline and Route 9 exits via Parkman Drive, which has one receiving lane. The Parkman Drive approach to Kelley Circle is STOP-controlled, and functions as a two-lane approach, even though all traffic must turn right.
  - Parkman Drive is a desirable crossing location for pedestrians traveling from the south to Jamaica Pond. However, high speed traffic, especially traffic exiting the circle to Parkman Drive, makes crossing at this location difficult.
  - Parkman Drive's wide receiving lane and large radius turn enables high vehicle exiting speeds.
  - Although the Parkman Drive approach to Kelley Circle has a STOP sign, drivers tend to treat the rotary entry as a YIELD, which creates problems for crossing pedestrians.
4. **Kelley Circle / Arborway / Pond Street / Cataumet Street.** This signalized intersection is located at the southern end of Kelley Circle. Immediately north of the intersection, an uncontrolled U-turn provides the connection from Parkman Drive to Jamaicaway northbound. At Pond Street, Kelley Circle has three southbound approach lanes: two through-lanes and a right turn lane. The two southbound through-lanes are directly aligned with the southbound Outer Arborway, while traffic bound for the Inner Arborway must make a sharp left turn coming out of the intersection. Pond Street has a single receiving lane and a single approach lane that must turn right into the intersection. Cataumet Street is a dead-end residential street with very low volumes and an actuated signal phase to enable residents to exit safely. Crosswalks are provided on all legs of the intersection, and a push-button actuates an exclusive pedestrian phase.
  - The signalized intersection at Pond Street constrains all southbound Emerald Necklace traffic, which limits the benefit of the rotary.
  - The Kelley Circle southbound through-lanes align directly with the Outer Arborway Southbound, as shown in Figure 4-3. The Outer Arborway Southbound is directly adjacent to homes and should carry lower traffic volumes than the Inner Arborway. However, drivers must make a sharp “S-turn” when exiting the intersection in order to use the Inner Arborway. As a result, the Outer Arborway carries higher traffic volumes than the Inner Arborway. This also causes problems at Murray Circle to the south.

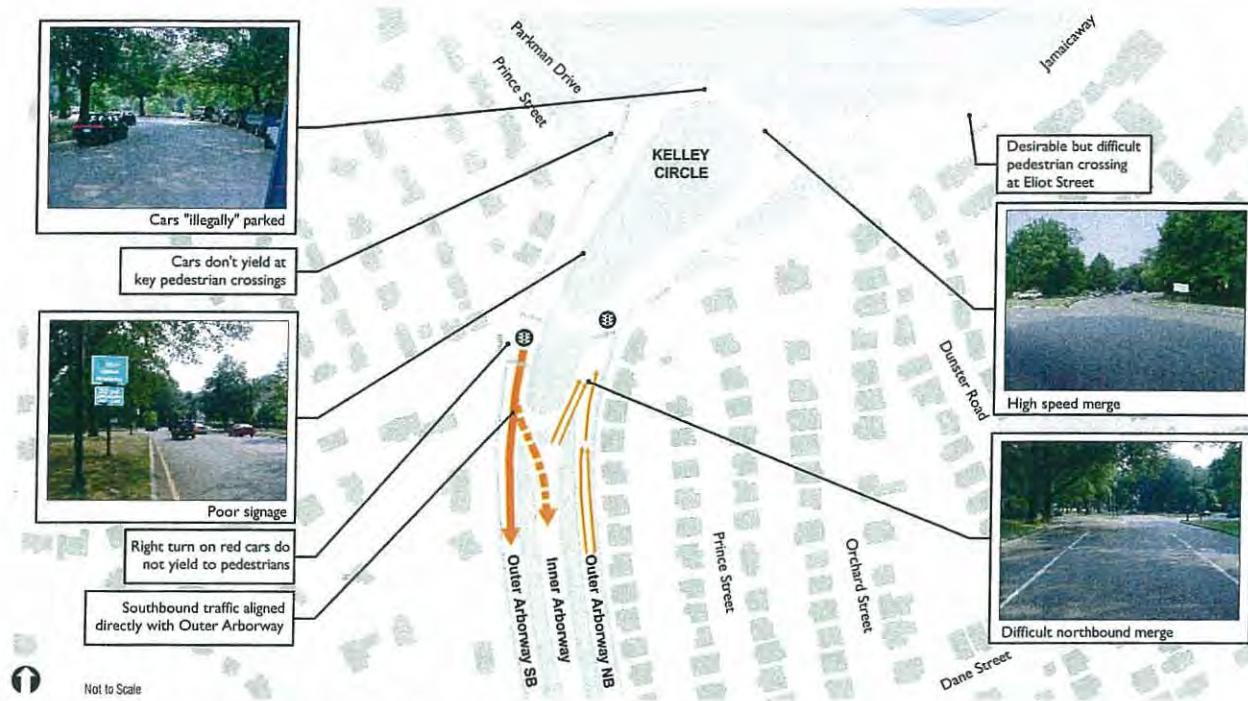


Figure 4-3 Transportation Issues at Kelley Circle

- Both U-turns (north of Pond Street and south of Pond Street) are fairly low volume, indicating that there is not heavy demand for connecting from Parkman Drive to Jamaicaway northbound and from Pond Street to Jamaicaway northbound. Presumably, this traffic is making this connection elsewhere (e.g. via Perkins Street).
- There are pedestrian signals at this intersection. There is a push-button actuated exclusive pedestrian phase. Many southbound vehicles turning right onto Pond Street make the turn on red without coming to a complete stop, in spite of the pedestrian “Walk” signal.

5. **Arborway / Kelley Circle.** The Arborway northbound enters Kelley Circle at a three lane approach approximately 125 feet north of where the northbound Inner Arborway and northbound Outer Arborway merge. There is a pedestrian signal located directly north of where the northbound Inner Arborway and Outer Arborway merge. This is a difficult merge, with the Outer Arborway merging from two lanes to one lane, then merging with the northbound Inner Arborway and the Kelley Circle southern U-turn. Both approaches then enter Kelley Circle and round a curve in the roadway. The signal in this location enables pedestrians to cross safely in the confusing area, and provides gaps for the northern Kelley Circle U-turn.

- The Outer Arborway Northbound has two lanes for most of its length. Approximately 100 feet south of the merge with Inner Arborway, the Outer Arborway Northbound is signed for an abrupt merge from two lanes to one lane, although there is enough room for two travel lanes. Field observations indicate that much of the Outer Arborway Northbound traffic does not make this merge. This results in a short, high-speed merge of the Outer Arborway Northbound left lane with the Inner Arborway right lane.
- There is a pedestrian signal at this location. During off-peak hours, this signal is set to stop traffic during every signal cycle, whether a pedestrian pushes the button or not. This provides easier crossings for pedestrians, and creates gaps for U-turn traffic and for Jamaicaway southbound entering traffic.

### Arborway between Kelley Circle and Murray Circle

The section of the Arborway between Kelly Circle and Murray Circle retains the distinctive three-roadway cross-section, with the main central roadway and the two side “carriageways.” It also retains the two wide medians and distinctive rows of red oaks.

- This segment of the Arborway has very high volumes, even higher than the other sections of the Emerald Necklace parkway system. This is because there is an “overlap” of travel routes in this section: heavy traffic between VFW Parkway / Centre Street and the Jamaicaway overlaps with heavy traffic between Morton Street / Arborway and Parkman Drive. As a result, peak hour traffic volumes in this section of the Arborway are approximately 40 – 50% higher than on the adjacent segments of the Arborway and the Jamaicaway.
- It is approximately 170 feet from one side of the Outer Arborway to the other side. Although there are two wide medians, this still represents a very wide roadway and a great deal of pavement. It is difficult for pedestrians to cross, especially with the high volumes of high-speed traffic.
- Although the Outer Arborway roadways are residential streets with active driveways, the roadway design and alignment results in their carrying higher volumes than the Inner Arborway.
- The wide medians provide green space that is visually attractive but difficult for pedestrians and bicyclists to reach due to high vehicle volumes and speeds and the lack of safe crossings. As a result, these medians are not usable green space, though the medians do continue to provide important visual benefits.



**Figure 4-4 Murray Circle Area**

**6. Murray Circle.** Murray Circle is a large rotary with high vehicular volumes. Murray Circle has four major approaches: the Inner Arborway and Outer Arborway both approach from the north, with a total of four lanes of southbound traffic entering the rotary; to the southwest, Centre Street has two entering lanes; and to the east, Centre Street westbound and Arborway northbound left turns enter the rotary from the adjacent signalized intersection. Murray Circle has two northbound exiting lanes to Inner Arborway, two southwestbound exiting lanes to Centre Street, two southbound exiting lanes to Arborway, and two eastbound exiting lanes that approach the adjacent signalized intersection.

- Murray Circle is a large rotary, which enables high entry speeds and circulating speeds.

- Most pedestrian crossings around Murray Circle are located directly adjacent to the circulating roadway, so that pedestrians must cross high speed weaving movements, where drivers are often distracted by other traffic.
- Protected pedestrian crossings are available at Centre Street / Hillcroft Street and at Arborway / Centre Street / Prince Street, but these crossings are circuitous.
- The Inner Arborway and Outer Arborway southbound approaches enter the rotary directly adjacent to each other, creating conflicts and driver confusion. This effect is mitigated somewhat by the fact that drivers familiar with Murray Circle tend to distribute themselves appropriately: most southbound drivers turning right onto Centre Street westbound tend to travel on the Outer Arborway rather than the Inner Arborway.
- Bicycle riding through the rotary can be difficult due to high vehicle speeds and high speed weaving across the outer lane of the circulating roadway, where bicyclists ride. This is especially problematic for southbound bicyclists, who tend to ride on the Outer Arborway but must then cross the heavy traffic flow onto Centre Street westbound.
- Large trees in the center island and at the western Centre Street approach reduce driver sight distance and make the high speed merges more difficult.

**7. Pedestrian Crossing of Centre Street adjacent to Murray Circle.** This signalized pedestrian crossing is located on Centre Street approximately 200 feet west of the outside of the Murray Circle rotary. This location provides a push-button actuated, protected pedestrian crossing.

- This pedestrian signal provides a protected crossing from the Arboretum across Centre Street toward Jamaica Pond. However, this connection is circuitous.
- During off-peak hours, this signal is set to stop traffic during every signal cycle, whether a pedestrian pushes the button or not. This provides easier crossings for pedestrians, and creates gaps for traffic entering on the eastern side of Murray Circle.

**8. Arborway Northbound / Centre Street / Prince Street.** This signalized intersection is located directly east of Murray Circle, but is outside of the circle, so it does not control any of the rotary's circulating traffic. It does, however, control the entering and exiting traffic immediate outside Murray Circle's eastern leg. There are four approaches to the intersection: the Arborway has two northbound lanes plus a YIELD-controlled right turn; Centre Street has two westbound approach lanes and two eastbound approach lanes exiting from the rotary; and Prince Street is a low-volume residential street that receives an actuated green phase when a vehicle is present. Concurrent pedestrian crossing phases are provided across the southern leg of the intersection and the eastern leg of the intersection.

- This signalized intersection is located adjacent to but outside of Murray Circle.
- The Arborway northbound approach is aligned directly with the Outer Arborway. This results in very heavy through-traffic on the northbound Outer Arborway.
- Arborway northbound traffic that would prefer to use the Inner Arborway must make a sharp left turn into Murray Circle and yield to the heavy Centre Street-to-Inner Arborway traffic.

**9. Upper Arborway / Centre Street / Orchard Street.** This is an unsignalized intersection located approximately 150 feet east of the signalized Arborway / Centre Street intersection. Centre Street is the major street, so its traffic has right of way over entering traffic from the minor streets. Upper Arborway and Orchard Street are the STOP-controlled minor streets. Upper Arborway and Orchard Street are both residential streets with moderate traffic volumes.

- The STOP-controlled minor street approaches to this intersection, Upper Arborway and Orchard Street, have relatively low volumes, and serve mostly local traffic. Upper Arborway does have somewhat higher volumes during the AM peak hour, resulting in LOS F for the Upper Arborway approach.

- This intersection is only about 100 feet from the signalized intersection of Arborway / Centre Street. Centre Street westbound queues from the Arborway signal can back up and block access from Upper Arborway and Orchard Street.

**10. Pedestrian Crossing of the Arborway at the Arnold Arboretum Gate.** This signalized pedestrian crossing is located approximately 600 feet south of the signalized intersection at Arborway / Centre Street. It provides a well-utilized crossing of high-speed Arborway mainline through-traffic, connecting the Jamaica Plain residential neighborhood and the Arnold Arboretum. The signal-protected pedestrian crossing of the Arborway mainline connects with a striped but unsignalized crossing of the Upper Arborway.

- This push-button actuated pedestrian signal provides a protected crossing between the Jamaica Plain residential neighborhood and the Arboretum. However, many users report that this crossing can be uncomfortable, with high speeds and a lack of compliance with the signal by some drivers. The traffic signals are mounted on poles on either side of the road and in the median, rather than overhead on wires or mast-arms, and the traffic signals have small 8-inch signal lenses. Poor visibility of the signals and the crossing may contribute to lack of compliance with this signal.
- There are marked pedestrian crossings across both the Arborway mainline and the Upper Arborway, which is parallel to the Arborway mainline. However, the traffic signal controls only the high-volume, high-speed Arborway mainline, not the low-volume, lower speed Upper Arborway that runs parallel to the Arborway mainline. Although a 15-foot median separates the Arborway mainline from the Upper Arborway, some neighborhood residents have commented that this situation is confusing, because pedestrians expect that the signal-protected crossing extends all the way across both the Arborway mainline and the Upper Arborway.

### **Arborway between Murray Circle and Forest Hills**

The section of the Arborway between Murray Circle and the Forest Hills area is also immediately adjacent to the Arnold Arboretum. The roadway in this section has two lanes in each direction, separated by a narrow median.

- There is a wide sidewalk adjacent to the Arboretum wall, but the sidewalk is in poor shape.
- When the Arborway mainline was widened to provide more roadway width, the trees in the median between the Arborway mainline and the Upper Arborway were removed. Otherwise, this segment of the Arborway is largely unchanged from the original Olmsted design.

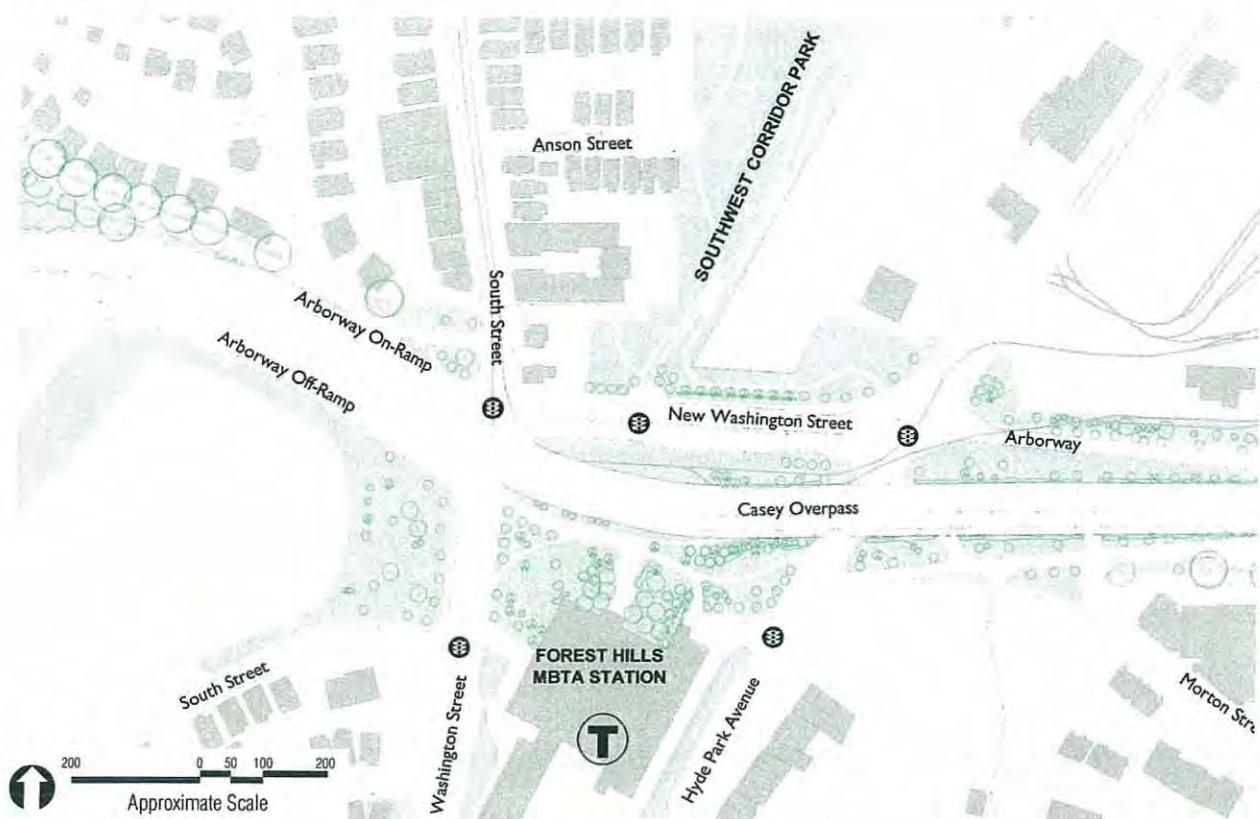


Figure 4-5 Forest Hills Area

### Arborway in the Forest Hills Area

The section of the Arborway in the Forest Hills area is dominated by the Casey Overpass, the construction of which eliminated much of the historic Arborway design and landscape in this area. The Casey Overpass carries high traffic volumes between the Morton Street corridor and the Arborway mainline, bypassing the congested surface intersection at South Street / Washington Street and at Washington Street / Hyde Park Avenue. The Casey Overpass creates a physical and visual barrier for pedestrians and bicycles traversing the historic Arborway corridor between Franklin Park, Forest Hills, the Southwest Corridor Park, and the Arnold Arboretum.

**11. Arborway Ramps / Washington Street / South Street / New Washington Street.** This signalized intersection located beneath the Casey Overpass and adjacent to the Forest Hills MBTA station has two control points: one directly north of the viaduct, where New Washington Street and the Arborway On-Ramp intersect South Street, and one directly south of the viaduct, where the Arborway Off-Ramp and Forest Hills busway intersect Washington Street. Each intersection approach has two lanes. A push-button actuated pedestrian phase is provided.

- Because this intersection has two control points, the eastbound and westbound approaches must be split into two phases, and additional time is needed to clear vehicles from the middle of the intersection.
- This intersection currently experiences high traffic volumes and significant congestion. Queuing and backups are particularly severe on Washington Street to the south of the intersection and on South Street to the north.
- There is an exclusive pedestrian phase. Pedestrian volumes on the southern leg of the intersection, across the Washington Street approach, are fairly heavy. The Arborway off-ramp right turns are heavy, and right turns on red may conflict with crossing pedestrians.
- There are no crosswalks on the eastern and northern sides of the intersection.

- Accessing the Casey Overpass sidewalks requires pedestrians and bicycles to cross at the top of the Arborway on-ramp or Arborway off-ramp. These are uncontrolled crossings of high-speed traffic. Crossing the on-ramp is particularly difficult, because the curve of the road and the retaining wall limit sight distance very severely.

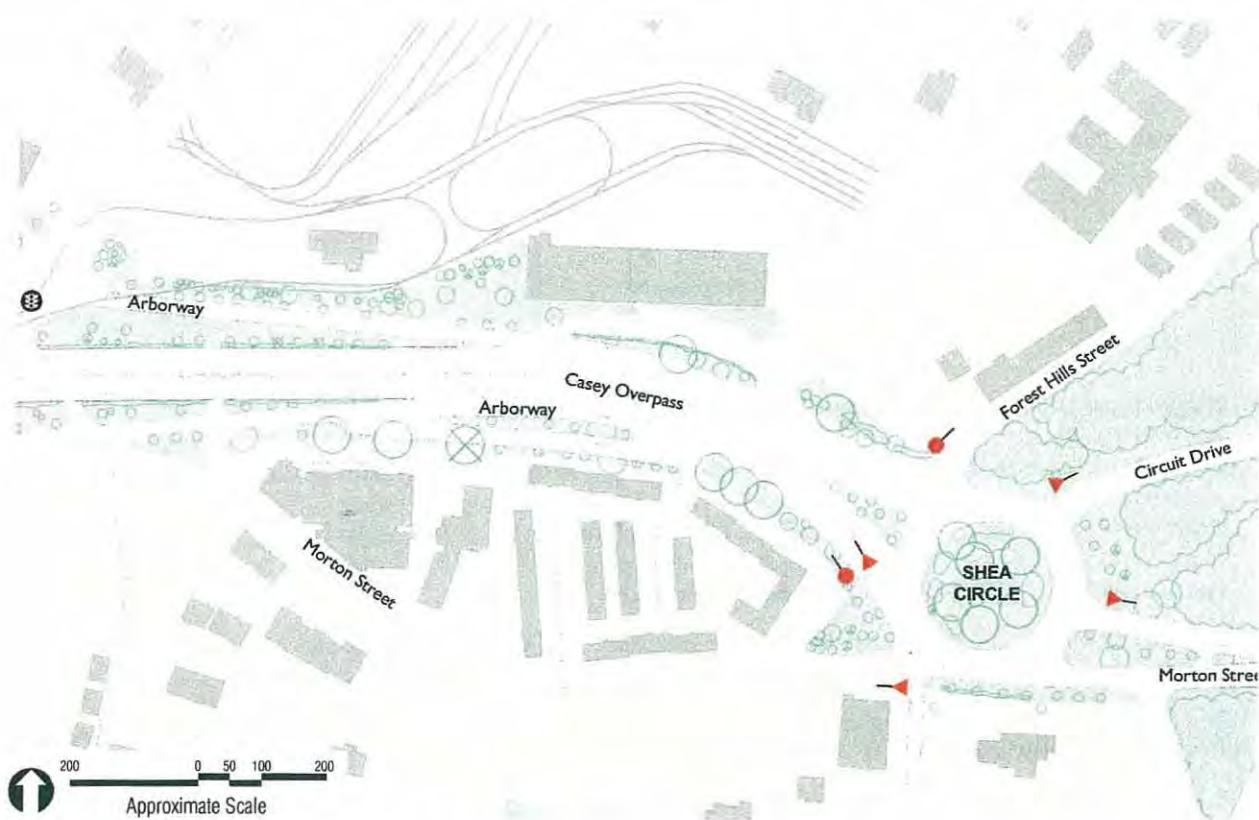
**12. Southwest Corridor Pedestrian Crossing of New Washington Street.** This signalized pedestrian crossing is located at the southern terminus of the Southwest Corridor Park, a linear park that runs along the Orange Line and connects Forest Hills to Back Bay Station. The crossing is approximately 200 feet east of the signalized intersection at Washington Street / South Street. It is a heavily used pedestrian and bicycle connection between the Jamaica Plain residential neighborhood and the Forest Hills MBTA station.

- This push-button actuated pedestrian signal provides a protected crossing between the Jamaica Plain residential neighborhood and the Forest Hills MBTA station. Pedestrian volumes are high and sight lines are good.

**13. Washington Street / New Washington Street / Arborway / Hyde Park Avenue.** This signalized intersection is located where Washington Street aligns with Hyde Park Avenue (Washington Street continues to the south on the other side of Forest Hills Station). This intersection is beneath and directly north of the Casey Overpass, and lies between the Forest Hills MBTA station and the Arborway Yard MBTA facility. The Washington Street southbound approach and the New Washington Street eastbound approach each has three lanes, while the Arborway westbound approach and the Hyde Park Avenue northbound approach each has two lanes. Concurrent pedestrian crossing phases are provided.

- This intersection has high traffic volumes, especially northbound on Hyde Park Avenue in the morning peak period and southbound on Washington Street during the evening peak period.
- This intersection has an unconventional design: the eastbound receiving lane exits the intersection at a diagonal to pass beneath Casey Overpass to Arborway eastbound.
- The Surface Arborway westbound approach and the New Washington Street eastbound traffic currently operate during the same signal phase. Due to the size of the intersection and the unusual alignment of the approaches, this creates vehicular conflicts that may have contributed to the high rate of traffic accidents at this location. The Boston Transportation Department has issued a contract to install a new controller at this intersection, and the signal timing will be changed in order to provide separate phases for the eastbound and westbound approaches. This should rectify the existing safety problem.

Figure 4-6 Shea Circle



#### 14. Shea Circle

Shea Circle is a large rotary located at the southern end of Arborway, where the Casey Overpass returns to grade. It has a large circular central island with complex roadway connections, extensive plantings, and a wide circulating roadway that accommodates two to three lanes. Shea Circle carries heavy traffic volumes between the Casey Overpass and Morton Street legs of the rotary. The Arborway legs of the rotary, which enter and exit immediately outside of the Casey Overpass legs, have lower traffic volumes. Forest Hills Street and the southwestern leg of Morton Street have even lower traffic volumes.

- Shea Circle is a very large rotary, which enables high circulating speeds and high entry speeds.
- Shea Circle has short weaving sections due to the closely-spaced approaches. However, the circulating roadway is very wide, which provides more space for vehicles to merge and circulate around the rotary.
- Pedestrian crossings around Shea Circle are not well-marked, and pedestrian ramps are missing at many curbs. There is no clear crossing of Circuit Drive at Shea Circle.
- Some pedestrians cross the circulating roadway to and from the central island. These pedestrians may be traveling between Forest Hills MBTA station and Franklin Park or the Shattuck Hospital. Crossing the circulating roadway of a rotary is dangerous due to the constant traffic flow. This is especially true at Shea Circle, with its wide circulating roadway and high speeds.
- Bicycle riding through the rotary can be difficult due to high vehicle speeds and high-speed weaving across the outer lane of the circulating roadway, where bicyclists ride.
- The Forest Hills Street approach is poorly aligned. It approaches the rotary almost at a tangent to the outside of the circulating roadway.

- The Forest Hills Street and Arborway eastbound approaches are STOP-controlled. This is contrary to conventional “Yield on entry” rotary regulation. Drivers on the Arborway approach, however, tend to behave more like yielding than stopping vehicles. This improves the traffic efficiency of Shea Circle, but makes crossing the Arborway to and from the Casey Overpass sidewalk more difficult.
- Shea Circle experiences lesser operational and vehicular safety problems than Murray Circle because the heaviest movements are through-movements between Casey Overpass / Arborway and Morton Street. As a result, entering traffic does not experience as much resistance from circulating traffic.

## 4.2 Pedestrian and Bicycle

The Arborway is an integral part of the Emerald Necklace, a linear park system that pedestrians, bicyclists and others value highly and use extensively. The Arborway is also an important green space for local residents in the surrounding neighborhoods, as a place to walk and bicycle and as a connection to the adjacent parks: Jamaica Pond, the Arnold Arboretum, and Franklin Park.

Information on existing pedestrian and bicycle transportation was obtained through user surveys, pedestrian and bicycle counts, and field visits. The user surveys and counts were conducted in June and July 2002. The field visits were made at various times during the study evaluate pedestrian, bicycle, and motor vehicle interaction, and to follow up on comments made by users and residents in the surveys.

### 4.2.1 Existing Pedestrian and Bicycle Facilities

A network of sidewalks is included in the Arborway from Jamaica Pond to Shea Circle. There are crosswalks at both signalized and unsignalized intersections in the corridor. No continuous off-road bicycle path is provided within the corridor, and no bicycle lanes are provided within the roadway. Most bicyclists travel in standard width travel lanes within the roadway, which is often congested.

Roadway, intersection and rotary designs encourage speeding motor vehicle traffic, which in turn discourages cycling by any but the most confident and experienced cyclists. Crossing the Arborway can also be intimidating for pedestrians and cyclists. This is especially risky at the rotary approaches, where motorists enter and exit the rotaries at high speeds and are often inattentive to pedestrians in the crosswalks. Where there are protected crossings, they are often removed from direct travel routes.

### 4.2.2 Survey of Pedestrian and Bicycle Travel Patterns

Surveys were conducted in summer 2002 of residents in neighborhoods along the Arborway and users of the Emerald Necklace parks. About 200 completed surveys were tabulated and summarized. Most of the respondents lived less than one mile from the destinations they visit along the Arborway. Visitation data are summarized in Table 4-1.

**Table 4-1 Survey Results – Park Visitation**

Destination	Number of Visitors	Percent Visiting	Average Visits per Month
Arborway	122	61	17
Jamaica Pond	176	88	11
Arnold Arboretum	171	86	9
Franklin Park	71	36	2

The vast majority of visits to the Arborway and adjoining park facilities are by foot followed by bicycle. Very few drive to the parkway or parks as shown in Table 4-2.

**Table 4-2 Survey Results – Mode of Access to Park Facilities**

Mode of Access	Number of Visitors	Percent Using Mode
Walk	163	82
Bicycle	76	38
Run	52	26
Auto	38	19
Subway	5	3
Bus	4	2

The survey identified locations where many Arborway pedestrians and bicyclists cross the parkway, as well as locations where respondents desire a safer crossing facility. Survey respondents indicated that crossing the Arborway is especially difficult at Kelley Circle and Murray Circle due to wide crossings, high traffic volumes and high motor vehicle speeds.

Existing crossing locations are shown on Figure 4-7. Locations are color coded based on the number of respondents. The locations with the highest number of existing crossings are shown as green lines, with the number of respondents who cross there noted.



**Figure 4-7 Existing Crossing Locations**

The crossing with the highest use based on the survey is the signalized crossing of the Arborway at the entrance to the Arnold Arboretum. Nearly one-third of respondents noted that they use this crossing. The second highest volume of crossings occurs at two unsignalized crossings: 1) Jamaicaway at Eliot Street and 2) Parkman Drive at Kelley Circle.

The survey also asked respondents to identify locations where pedestrians and bicyclists wish to cross, but feel unsafe. The responses to this question were similar to the responses to the question about where respondents currently cross. Again, most respondents indicated locations in the vicinity of Kelley Circle and Murray Circle, as shown in Figure 4-8. Half of survey respondents want a safer crossing of the Jamaicaway at or near Eliot Street, and indicated that they felt it should be signal-protected. It is notable that although many respondents indicated that they cross at the Washington Street / South Street / New Washington Street intersection and the New Washington Street pedestrian crossing near Forest Hills, very few respondents identified these signal-protected crossings as feeling dangerous.



**Figure 4-8 Desired Crossing Locations**

There is a very strong pedestrian desire line across the Jamaicaway at Eliot Street because it is a direct route from the neighborhoods to Jamaica Pond. This has become much more dangerous as the volume of traffic and the speeds of motor vehicles have increased. Many survey respondents and participants at public meetings also expressed concern about the pedestrian crossing at Parkman Drive adjacent to Kelley Circle due to high vehicle speeds and the failure of many motorists to yield to pedestrians in the crosswalk.

Fewer survey respondents cross the Arborway and Centre Street at Murray Circle, but these crossings are also difficult because of the high design speed of the rotary and its approaches. Other high volume crossings are at Washington Street / New Washington Street and at New Washington Street near the Forest Hills train station.

### 4.3 Motor Vehicles

The Arborway is a historic landscape that also serves as a major vehicular roadway. The Arborway was designed as a continuous linear space, with relatively infrequent intersections, like the rest of the Emerald Necklace. This basic configuration has made the parkway connection through the Arborway, and through the rest of the Emerald Necklace, attractive as a motor vehicle route.

The changes to the Arborway's original Olmsted design (the rotaries, the Casey Overpass, and the widening of the Arborway in the segment between Murray Circle and the Casey Overpass) have facilitated increasing motor vehicle demand and increasing vehicle speeds. As a result of the Arborway's design, the changes to the design that benefit

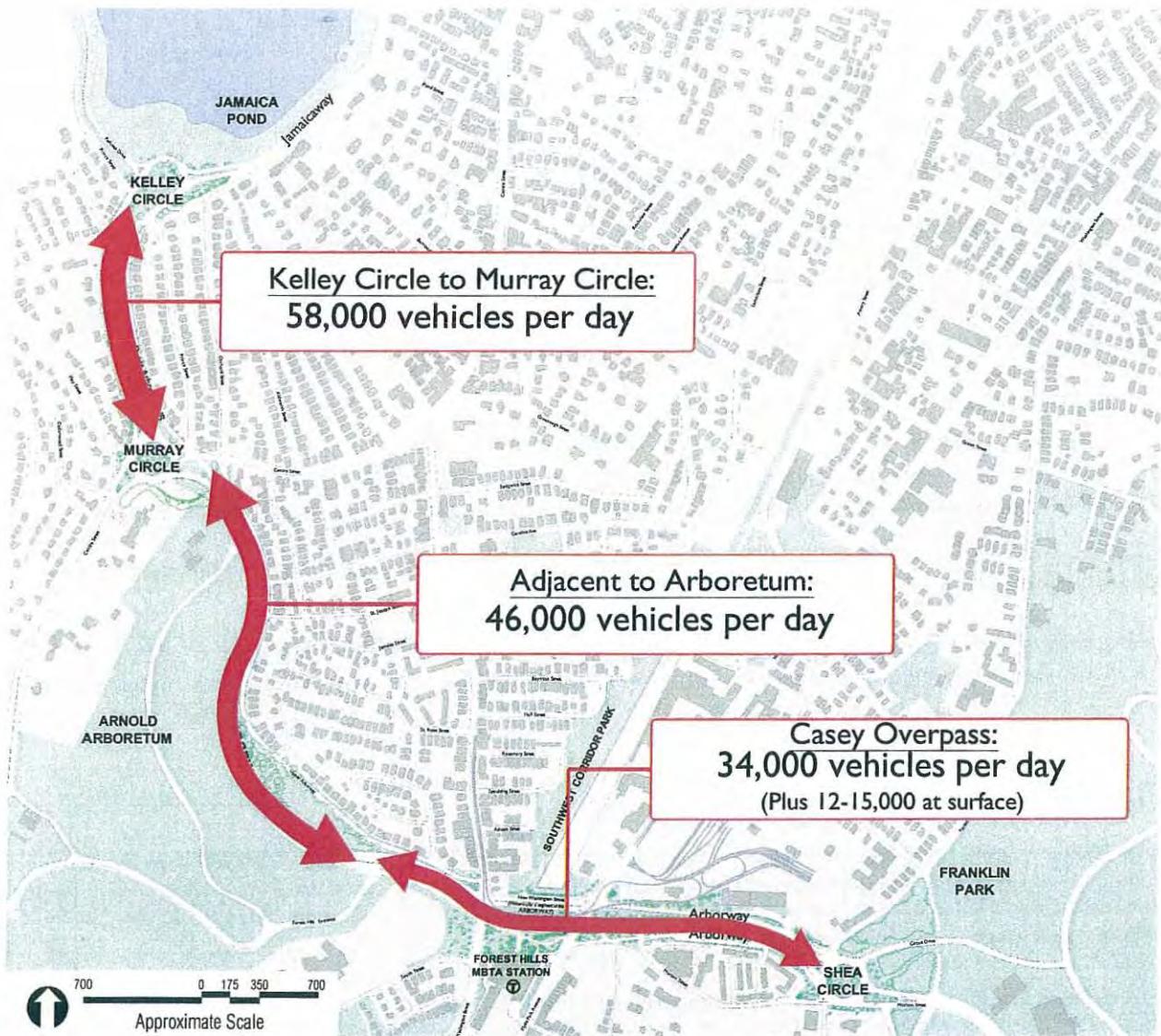
motor vehicles, and changing demographics and travel patterns, the Arborway currently serves as a major regional motor vehicle route.

The following is a discussion of the Arborway's principal motor vehicle characteristics, including traffic volumes along the Arborway, traffic accidents on the Arborway, traffic speeds, and traffic operations.

#### 4.3.1 Traffic Volumes

In order to quantify existing traffic conditions in the project study area, daily and peak period traffic volumes were counted for the study area. Traffic counts for the southern half of the study area (from the western end of the Casey Overpass to Shea Circle) were conducted in June 2002, prior to the end of the public school year. For the northern half of the study area, from Kelley Circle through Murray Circle, traffic counts taken in May 1999 for the Metropolitan District Commission's *Arborway Traffic Calming Study* were used.

The weekday 24-hour traffic volumes for the three main segments of the Arborway (Kelley Circle to Murray Circle, Murray Circle to South Street, Forest Hills Area: South Street to Shea Circle) are shown in Figure 4-9.



### Figure 4-9 24-Hour Traffic Volumes

The total daily traffic volumes on the Arborway between Kelley Circle and Murray Circle are significantly higher than the traffic volumes on the segment of the Arborway adjacent to the Arnold Arboretum. This reflects the fact that two major regional roadways meet at both ends of this segment: the Arborway and Centre Street meet at Murray Circle, and the Jamaicaway and Parkman Drive meet at Kelley Circle. As a result, two major regional roadways effectively “overlap” in the segment of the Arborway between Kelley Circle and Murray Circle. This results in significantly higher traffic volumes than on adjacent segments of the Emerald Necklace roadways.

The turning movement counts (TMCs) capture the volumes of all specific traffic movements at each study area intersection, i.e. northbound left turn, eastbound through-movement, etc. These movements are necessary for determining each intersection’s peak hour operational characteristics using traffic capacity analysis software. The traffic count data are included in Appendix C.

### 4.3.2 Safety Analysis

The history of traffic accidents in the Arborway corridor was evaluated in order to identify any locations with traffic safety issues. Traffic accident data were obtained from Massachusetts Highway Department (MassHighway) records for the most recent three-year period available (1998 through 2000) and are contained in Appendix D.

The accident records were reviewed to identify the number of accidents at a given location, the type of accident, and the severity of the accident. The rate of accidents as a function of traffic volume was calculated to serve as a means of comparison between different locations with different traffic volumes, as well as with statewide accident rates. Accident rates for intersections are typically calculated in terms of “accidents per million entering vehicles” (per MEV). The statewide average rates for Massachusetts are 0.87 accidents / MEV for signalized intersections, and 0.66 accidents / MEV for unsignalized intersections.

**Table 4-3 Traffic Accident Summary**

Intersection	Year				Severity (3-Year Totals)				Type (3-Year Totals)				Crash rate
	3-Year Total	1998	1999	2000	Injury	Fatality	Property Damage	Unknown	Angle	Rear End	Head On	Other	
1. Jamaicaway / Eliot Street	3	1	1	1	0%	0%	100%	0%	67%	33%	0%	0%	0.06
2. Jamaicaway / Kelley Circle	19	2	10	7	32%	0%	68%	0%	53%	32%	0%	16%	0.35
3. Kelley Circle / Parkman Drive / Prince Street	15	8	4	3	27%	0%	73%	0%	20%	53%	0%	27%	0.32
4. Arborway / Pond Street / Cataumet Street	15	5	4	6	20%	0%	80%	0%	47%	33%	0%	20%	0.30
5. Pedestrian Signal at Arborway Northbound Merge	1	0	0	1	0%	0%	100%	0%	0%	0%	0%	100%	0.04
Kelley Circle Total	50	15	18	17	26%	0%	74%	0%	40%	38%	0%	22%	--
6/8. Murray Circle/Arborway Northbound / Centre Street / Prince Street	109	36	31	42	32%	0%	62%	6%	51%	32%	1%	16%	1.27
7. Pedestrian Signal at Centre Street / Hillcroft Road	11	4	4	3	45%	0%	55%	0%	9%	91%	0%	0%	0.25
9. Upper Arborway / Centre Street / Orchard Street	1	1	0	0	0%	0%	100%	0%	0%	0%	0%	100%	0.08
10. Pedestrian Signal at Arborway / Arboretum Gate	2	0	1	1	50%	0%	50%	0%	50%	0%	0%	50%	0.04
11. South Street / Washington Street / New Washington Street /	68	30	23	15	44%	0%	49%	7%	43%	26%	0%	31%	1.76

Arborway Ramps	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0
12. Pedestrian Signal at New Washington Street / Southwest Corridor	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0
13. Arborway / Washington Street / New Washington Street / Hyde Park Avenue	68	29	17	22	50%	1%	43%	6%	37%	32%	3%	28%	1.67
14. Shea Circle	76	22	29	25	34%	0%	62%	4%	37%	36%	3%	25%	1.31
Other Arborway	50	12	19	19	52%	0%	44%	4%	32%	16%	8%	44%	

Table 4-3 demonstrates issues related to the Arborway's traffic accident history. At Kelley Circle, the traffic accident records generally track the different entry points (i.e. Jamaicaway, Parkman Drive, Pond Street) as separate accident locations. Taken individually, none of these locations has a high concentration of accidents. Nevertheless, among all four entry points to Kelley Circle, there are a total of 50 accidents over three years, or about 17 accidents per year.

Traffic accidents have been combined for Murray Circle and for the adjacent signalized intersection of Arborway Northbound / Centre Street because the MassHighway accident records do not appear to distinguish between these locations (accident records typically list the location as Arborway at Centre Street). This location has a high level of accidents: 109 accidents over three years, or an average of 36 accidents per year.

The two principal intersections in the Forest Hills area of the Arborway corridor also experience high rates of traffic accidents. The intersection of South Street / Washington Street / New Washington Street / Arborway Ramps experienced 68 accidents over three years, or about 23 accidents per year. This produces an accident rate of 1.76 accidents per MEV, and 44% of the accidents entailed personal injury. These traffic accidents may be attributable to the high level of congestion and queuing at this intersection.

The intersection of Arborway / Washington Street / New Washington / Hyde Park Avenue had a total of 68 accidents over three years, or about 23 accidents per year. This produces a similarly high accident rate of 1.67 accidents per MEV, with 50% involving personal injury. The high crash rate at this intersection may be due to its unusual layout: to the west of the intersection, New Washington Street is a two-way roadway to the north of the Casey Overpass, while to the east of the intersection, the Surface Arborway is a one-way pair, with the westbound roadway to the north of the Casey Overpass and the eastbound roadway to the south. The Surface Arborway westbound approach has heavy left turns: approximately 300 during each AM and PM peak hour. Under the existing traffic signal phasing, the westbound left turn has a leading left turn phase, then the eastbound and westbound traffic operates on the same phase. The westbound left turns tend to continue flowing, although the eastbound through-traffic should have the right of way, producing an unsafe conflict. There is currently a contract to install a new signal controller at this intersection, and to split all the eastbound and westbound traffic into separate phases. This should rectify the existing conflict between the westbound left turns and the eastbound through-traffic.

Shea Circle had a total of 76 accidents over a three year period, or about 25 accidents per year, for an accident rate of 1.31 accidents per MEV. This is a fairly high accident rate, which may be attributable to high speeds through the large rotary, unconventional rotary approaches (especially Surface Arborway eastbound, Forest Hills Street, and the segment of Morton Street to the southwest of the circle), and poor sight lines from the Surface Arborway eastbound back up to the Casey Overpass approach.

#### 4.3.3 Traffic Speeds

A common complaint about conditions on the Arborway is excessive speed. Residents and other Arborway users perceive that speeds on the Arborway are typically much higher than the 30 mile per hour posted speed limit, in spite of the presence of homes and driveways, narrow travel lanes, and roadway curves.

In order to evaluate the magnitude of the problem, vehicle speeds on the Arborway adjacent to the Arnold Arboretum were surveyed and recorded. A total of 200 vehicles were observed: 50 vehicles in each direction, during each peak period, both morning and afternoon. The following is a summary of the results of this speed study.

**Table 4-4 Arborway Vehicle Speed Summary**

Speeds (in mph)	AM Peak Hour		PM Peak Hour	
	Northbound	Southbound	Northbound	Southbound
Speed Limit	30	30	30	30
Minimum Speed	30	31	30	31
Median Speed	37	40	38	38
85 <sup>th</sup> Percentile Speed	40	44	45	43
Maximum Speed	44	52	48	52

Location: Arborway mainline adjacent to Arnold Arboretum

Table 4-4 shows that resident and visitor observations of high vehicle speeds are consistent with the observed vehicle behavior. Only the slowest vehicles observed traveled at the speed limit of 30 mph. The median travel speed was 7 – 10 miles per hour higher than the speed limit, and the maximum speed observed during both the morning and afternoon peak periods was 52 mph, which approaches freeway speeds.

Due to the higher traffic volumes and greater congestion during commuter peak periods, it is possible that speeds during off-peak periods are even higher than those observed during peak periods. The Arborway's relatively long uninterrupted roadway segments between major intersections may contribute to these high vehicle speeds.

#### **4.3.4 Traffic Operations**

Existing peak hour traffic operations in the project study area were quantified by calculating intersection operating levels of service. The methodology and results of the capacity analysis are presented below.

#### **Level of Service Criteria**

Level of Service (LOS) is a term used to describe the quality of the traffic flow on a roadway facility at a particular point in time. It is an aggregate measure of travel delay, travel speed, congestion, driver discomfort, convenience, and safety based on a comparison of roadway system capacity to roadway system travel demand. Operating levels of service are reported on a scale of A to F, with A representing the best operating conditions and F representing the worst operating conditions. Level of Service A represents free-flow or uncongested conditions with little or no delay to motorists, while Level of Service F represents a forced-flow condition with significant delays and traffic demands exceeding roadway capacity.

#### **Intersection Operating Conditions**

The procedures described above were used to determine existing weekday AM and PM peak hour operating levels of service at the study intersections. The analysis results for the study area's signalized intersections are presented in Table 4-5, and the results for unsignalized intersections, including rotaries and STOP-controlled intersections, are presented in Table 4-6. Traffic capacity analysis worksheets are provided in Appendix E.

**Table 4-5 Signalized Intersection Operations – Existing Conditions**

Location	Peak Hour	2002 Existing Conditions	
		Level of Service	
4. Kelley Circle at Pond Street / Cataumet Street	AM	D	
	PM	E	
5. Pedestrian Crossing at Inner / Outer Arborway NB Merge / Kelley Circle	AM	B	
	PM	A	
7. Pedestrian Crossing of Centre Street at Hillcroft Road	AM	C	
	PM	B	
8. Arborway Northbound / Centre Street / Prince Street	AM	E	
	PM	B	
10. Pedestrian Crossing of Arborway at Arboretum Gate	AM	A	
	PM	A	
11. Arborway Ramps / South Street / Washington Street	AM	F	
	PM	F	
12. Southwest Corridor Pedestrian Crossing of New Washington Street	AM	A	
	PM	A	
13. Arborway / Washington Street / New Washington Street / Hyde Park Ave.	AM	C	
	PM	C	

Table 4-5 summarizes the overall level of service, delay, and volume-to-capacity ratio for each signalized intersection in the study area. At a signalized intersection, the level of congestion and delay can be described for the intersection as a whole, because the traffic signal can allocate “green time” among the various intersection approaches to balance the congestion and delay.

**Table 4-6      Unsignalized Intersection Operations – Existing Conditions**

Location	Peak Hour	2002 Existing Conditions	
		AM	Level of Service
Kelley Circle (Rotary)			
2. Jamaicaway SB at Kelley Circle	AM	D	
	PM	A	
3. Parkman Drive EB at Kelley Circle	AM	B	
	PM	F	
6. Murray Circle (Rotary)			
Centre Street (EB)	AM	E	
	PM	C	
Centre Street (WB)	AM	B	
	PM	A	
Inner Arborway (SB)	AM	A	
	PM	B	
Outer Arborway (SB)	AM	B	
	PM	F	
8. Centre Street at Upper Arborway (NB)	AM	F	
STOP-controlled	PM	C	
Orchard Street (SB)	AM	B	
STOP-controlled	PM	B	
14. Shea Circle (Rotary)			
Morton Street (WB)	AM	A	
	PM	A	
Circuit Drive	AM	F	
	PM	A	
Forest Hills Street	AM	C	
	PM	A	
Arborway Overpass	AM	A	
	PM	A	
Arborway Surface	AM	A	
	PM	E	

Table 4-6 summarizes the level of service, delay, and volume-to-capacity ratio for every approach to the rotaries in the study area, and for every STOP-controlled approach at an unsignalized intersection. In the case of rotaries and STOP-controlled intersections, it is important to summarize congestion and delay in this manner. Because traffic operations at unsignalized intersections and rotaries cannot be actively controlled as they can at signalized intersections, the traffic operations for different rotary approaches and different STOP-controlled approaches can vary widely. Delay and congestion at rotary approaches and STOP-controlled approaches are primarily dependent upon the level of demand at that approach, and the volume of opposing traffic in which a “gap” must be found.



## 5.0 Alternatives Analysis

The Arborway Master Plan study process included an extensive analysis of improvement alternatives. Based on the Master Plan issues and objectives, as well as proposals from agencies and the community, a series of design alternatives were proposed and evaluated for various segments of the Arborway. These alternatives were analyzed for physical feasibility, historic landscape benefits, pedestrian and bicycle accommodation, and traffic impacts.

This section describes the alternatives analysis approach, the improvement alternatives that have been reviewed, and the results of the alternatives analysis. The design and review of improvement alternatives was executed in three major stages.

First, the Arborway Master Plan's goals, the findings of the historic research, and the existing conditions analysis were translated into a set of design objectives. Then a series of "preliminary alternatives" were proposed, evaluated to assess their benefits and impacts, and rejected or refined to improve traffic operations and/or constructability. Finally, the most promising of the refined alternatives were further developed as "design alternatives" to enable a thorough evaluation of each alternative's advantages and disadvantages. The development of the design alternatives was guided by the study goals and objectives, and the need to balance enhancing the historic landscape with bicycle and pedestrian improvements as well as safe and acceptable motor vehicle accommodation.

### 5.1 Corridor Design Objectives

The following are the central principles that have guided the formulation of the proposed improvement alternatives. These principles are based on the study's overall objectives, and are intended to facilitate the integration of the three key components of the study: historic landscape preservation and restoration, pedestrian and bicycle accommodation, and motor vehicle safety and mobility.

The following is a review of the study objectives, and a description of the design principles that arise from these objectives.

#### ▪ Protect and enhance the historic landscape.

- **Preserve extant historic resources.** The Arborway has been altered significantly since the original Olmsted design period. Therefore, preserving all extant elements of the original Olmsted design is a top priority. The Arborway Master Plan improvement alternatives focus on changes to the existing Arborway design that only affect areas that have already been changed from the original Olmsted design. Sections of the Arborway that have been significantly altered include the rotaries (Kelley Circle, Murray Circle, Shea Circle) and the Forest Hills area at and around the Casey Overpass. In the sections of the Arborway that have not been significantly altered, including the segment between Kelley Circle and Murray Circle and the segment adjacent to the Arboretum, the extant historic landscape features should be preserved.
- **Restore lost historic landscape.** Some elements of the original Olmsted design were lost when the Arborway's landscape was changed, especially at the rotaries and in the Forest Hills area (by the Casey Overpass and other changes). The proposed alternatives take advantage of opportunities to restore elements of the lost Olmsted landscape to a condition that reflects the original design intent. In keeping with this objective, the alternatives evaluated for the Arborway Master Plan include an alternative that would remove the three large rotaries and the Casey Overpass, and restore the original Frederick Law Olmsted Sr. design throughout the Arborway. The implications of this alternative are described below.
- **Expand the usable park space of the Arborway.** There are locations along the Arborway where there are opportunities to reduce paved areas and create new park space where there was no park space in the original Olmsted design. Although such park space does not have relevance from a historic preservation standpoint, replacing pavement with park space can improve roadway safety, enhance pedestrian and bicycle access, and increase the green space available for park users.

- **Enhance pedestrian and bicycle connections throughout the Arborway.**
  - **Create a continuous off-street, shared-use path for pedestrians and bicycles.** Providing a continuous, recognizable path for pedestrians and for bicycles through the Arborway is a central goal of the Arborway Master Plan. In addition, the bicycle path should be an off-street path for several reasons: many users are expected to be recreational bicyclists, including the young and the old; there are high volumes of traffic traveling very fast on the Arborway; and the original Olmsted design included a bridle path (“The Ride”) as an off-street path. Because the bicycle path should be an off-street path, and there are width limitations in many locations along the Arborway, an off-street shared-use path for both pedestrians and bicyclists is recommended.
  - **Provide a robust sidewalk network with improved connectivity throughout the Arborway.** In addition to the continuous shared-use pedestrian / bicycle path, the Arborway should have a robust network of continuous sidewalks. The sidewalks should provide direct connections along major desire lines.
  - **Provide safe, comfortable crossings of the Arborway at key intersections and desire lines.** The shared-use bicycle / pedestrian path and the sidewalk network should be connected by safe, comfortable roadway crossings. Where possible, pedestrians and bicyclists should be provided with the option of a signal-protected crossing, especially on the main shared-use bicycle / pedestrian path. Unsignalized crossings should be appropriately designed, regulated, and signed to provide safe and comfortable crossings.
- **Provide safe motor vehicle access and accommodate existing traffic demand.**
  - **Better organize traffic flows and vehicular connections.** Existing roadway connections along the Arborway can be confusing. There are redundant connections, high vehicle speeds, and confusing rotaries. Traffic safety and operations could be improved by reviewing roadway design at these locations and providing clear connections. Redesigning these large rotaries could reduce the amount of pavement and better organize traffic flows at these locations.
  - **Allocate pavement efficiently.** There is currently a large amount of paved area at the Arborway’s major intersections, particularly Kelley Circle, Murray Circle, and Shea Circle. Reducing the paved area while still providing the necessary connections would help to improve the historic landscape and pedestrian and bicycle access, while not necessarily diminishing motor vehicle operations.
  - **Accommodate existing traffic demand, and future traffic increments due to general background increases.** The Arborway is used by high volumes of traffic. The drivers that use the Arborway, including many Jamaica Plain and West Roxbury residents, have come to rely on the Arborway as their best route. It would be inappropriate to diminish these drivers’ mobility and force traffic onto other roadways. The Arborway should accommodate existing traffic demand, along with an appropriate amount of future traffic growth, without excessive congestion and delay.

## 5.2 Improvement Alternatives

Improvement alternatives for the Arborway were proposed and evaluated based on the corridor-wide design principles. In addition, each section of the Arborway has its own specific issues and conditions that shaped the development of the alternatives. As a result, the development of alternatives is described for each of the major sections of the Arborway:

- Kelley Circle to Murray Circle
- Arborway Adjacent to the Arnold Arboretum
- Forest Hills Area
- Shea Circle

The following is a summary of the alternatives that were reviewed, their characteristics (historic landscape, pedestrian, bicycle, and motor vehicle), and the advantages and disadvantages of the alternatives.

## 5.2.1 Kelley Circle to Murray Circle

### Design Objectives

The Arborway between Kelley Circle and Murray Circle presents a challenging combination of historic landscape, pedestrian and bicycle, and motor vehicle issues. Kelley Circle and Murray Circle are locations where the original Olmsted design was changed extensively in order to improve motor vehicle mobility. However, the section between the two circles is the only segment of the Arborway that is essentially unchanged from the original Olmsted design. This section of the Arborway connects dense residential neighborhoods, the Arnold Arboretum, and Jamaica Pond, but the pedestrian and bicycle access is difficult due to the high vehicle volumes and speeds. Any recommended improvements for Kelley Circle and for Murray Circle must work together as a system, because of the roadway design and the interaction of the traffic streams between the two rotaries.

#### ▪ **Historic Landscape**

- The segment of the Arborway between Kelley Circle and Murray Circle is the only segment of the Arborway that is essentially unchanged from the original Olmsted design, so preserving the historic integrity of this roadway segment is a top priority.
- This segment of the Arborway retains strong elements of the Olmsted character-defining features, including the clearly delineated rows of oaks and the robust tree canopy over the parkway.
- The eastern median, between the Inner Arborway and the Outer Arborway Northbound, was the historic location of “The Ride,” Olmsted’s bridle path. From a historic standpoint, this could be a desirable location for a continuous shared-use bicycle / pedestrian path.

#### ▪ **Pedestrian / Bicycle**

- There should be a continuous, recognizable shared use bicycle / pedestrian path with signal-protected roadway crossings.
- There are a number of potential locations for the path, including the western edge of the Outer Arborway Southbound, the eastern edge of the Outer Arborway Northbound, the western median, or the eastern median.

#### ▪ **Motor Vehicle**

- Traffic volumes between Kelley Circle and Murray Circle are very high due to the overlap of major regional traffic routes: Arborway and Centre Street meet at Murray Circle, and Jamaicaway and Parkman Drive meet at Kelley Circle.
- Kelley Circle and Murray Circle both have high volumes of “left turns” through the rotaries. These movements create conflicts in the circulating roadways and present obstacles to reconfiguring the rotaries.
  - At Kelley Circle, high volumes of traffic circulate from the Jamaicaway southbound to the Arborway southbound. This traffic must cross high volumes of traffic circulating from the Arborway northbound to Parkman Drive.
  - At Murray Circle, high volumes of traffic circulate from Centre Street eastbound to the Inner Arborway northbound. This traffic must cross high volumes of through traffic traveling southbound on the Arborway.
- The Outer Arborway roadways, northbound and southbound, are residential streets with active driveways. However, the existing roadway alignment for both the northbound and southbound approaches results in higher traffic volumes on the Outer Arborway roadways than on the Inner Arborway.
- The Inner Arborway does not have adequate capacity to support all of the through-traffic, so the Outer Arborway Northbound and Southbound must continue to carry significant traffic volumes, though these volumes can be lower.
- At Kelley Circle, the northbound Inner Arborway and the Outer Arborway Northbound have a difficult merge of four lanes to three lanes.

- At Murray Circle, the southbound Inner Arborway and the Outer Arborway Southbound have a difficult merge, with four lanes entering the rotary directly adjacent to each other. The proposed roadway redesign should address these difficult merges.
- Currently, all of the Arborway roadways in this segment provide full access to and from all connections. Drivers can connect to and from the Inner Arborway, the Outer Arborway Southbound, and the Outer Arborway Northbound via all entry and exit routes. This results in high-speed merges and conflicts.
- Merging conditions could be improved and traffic volumes on the two Outer Arborway roadways could be reduced by controlling access to and from these roadways. The Outer Arborway Southbound could provide access only for local traffic and Centre Street westbound traffic. The Outer Arborway Northbound could provide access only for local traffic and for Arborway northbound through-traffic to the Jamaica Way northbound. By controlling traffic flows in this manner, traffic volumes on the Outer Arborway roadways could be significantly reduced, but not to the degree that the diverted traffic would overwhelm the Inner Arborway. The conceptual re-organization of traffic flows is shown in Figure 5-1.

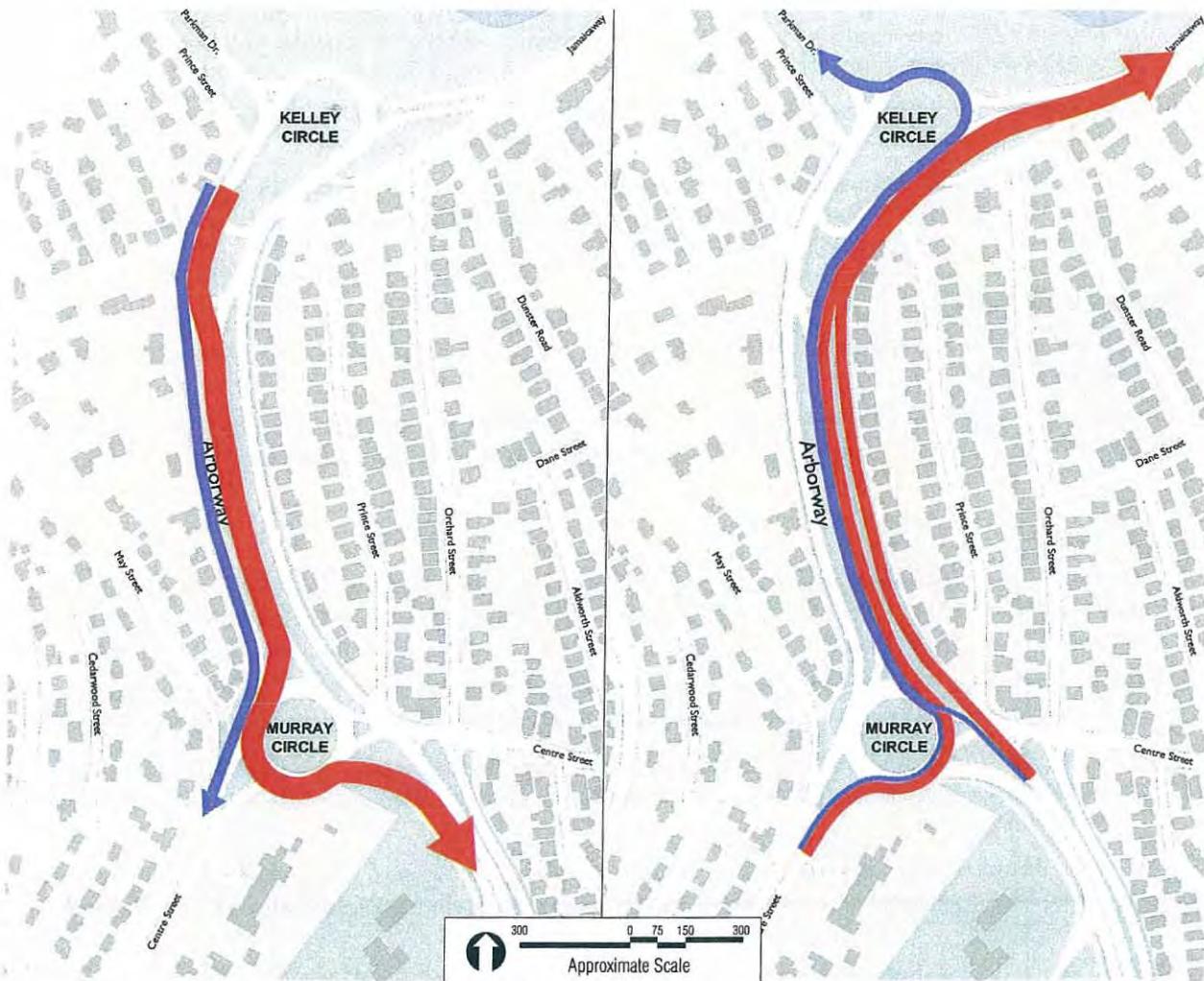


Figure 5-1 Conceptual Re-Organization of Traffic Flows

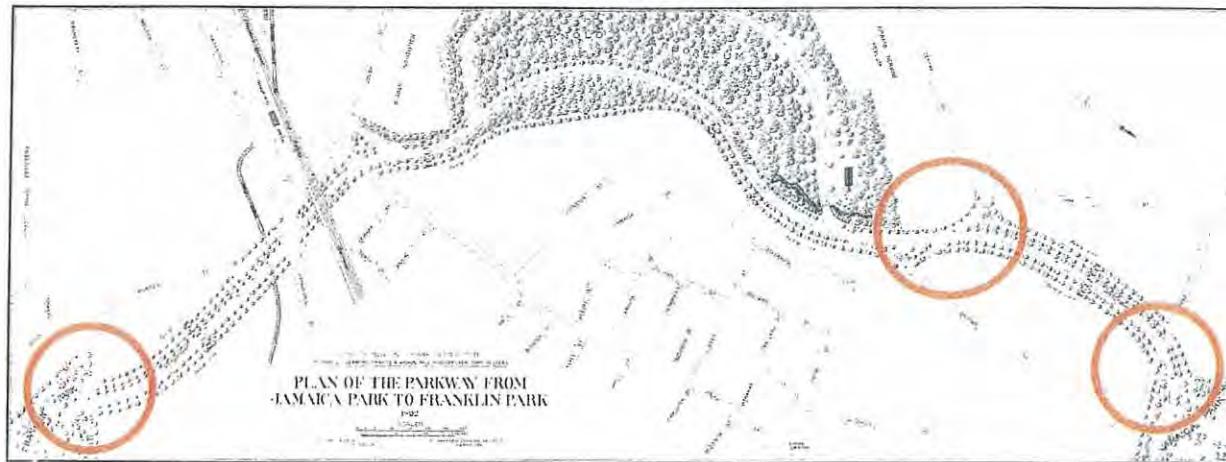
### Preliminary Alternatives

**Kelley Circle, Murray Circle, Shea Circle.** Kelley Circle and Murray Circle, as well as Shea Circle, have many similarities. Therefore, the preliminary alternatives considered for all three rotaries have conceptual similarities, and will be discussed together.

At the three rotaries, intersecting roadways were replaced in the mid-20<sup>th</sup> century with large rotaries in order to reduce traffic bottlenecks and enable faster, higher-capacity traffic flow. The creation of these rotaries significantly increased the amount of pavement, and decreased the amount of green space. This resulted in a loss of historic landscape, and it created obstacles for pedestrian and bicycle access due to the width of crossings, heavy traffic volumes, and high motor vehicle speeds.

The preliminary alternatives analysis included a few basic approaches to improving the rotaries:

- **Original Olmsted Design.** The original Olmsted design of the Arborway was reviewed, and conceptual roadway layouts were developed for Kelley Circle, Murray Circle, and Shea Circle. The Olmsted design at these locations entails intersections, rather than rotaries, as shown in Figure 5-2. Based on the very high current traffic volumes at these locations, these intersections would require traffic signals.



**Figure 5-2 Original Olmsted Design**

Olmsted designs were ultimately rejected for the three rotaries due to poor traffic safety characteristics and excessive traffic congestion and queuing. The roadway layouts based on the Olmsted design are unsafe due to poorly aligned roadways, intersection approaches with excessively sharp angles, and closely-spaced intersections (e.g. at the Inner Arborway and Outer Arborway approaches to Pond Street or Centre Street).

The Olmsted roadway designs have narrow roadway alignments and intersection approaches that cannot accommodate the current traffic demand. As a result, the Olmsted roadway designs cause high levels of traffic congestion and queuing at each of the three rotary locations. All three intersections would operate at level-of-service F during both morning and afternoon peak hours, and all would have excessive queues. Based on the calculated capacity for these intersections, the total queue at the Arborway / Centre Street intersection (the current location of Murray Circle) projected for the 2014 morning peak hour is 12.5 lane-miles of traffic, and the total queue projected for the 2014 afternoon peak hour is 10.5 lane-miles of traffic. Assuming that each roadway approaching this intersection has two lanes in each direction and the queue is evenly distributed among the four approaches, the morning peak hour queue would extend 1.6 miles in each direction. In addition, that is only the queue that would develop during a single hour; this queue would continue to build after the peak hours. Therefore, the original Olmsted design was rejected at each of the current rotary locations as unacceptable from a traffic safety and traffic congestion standpoint.

- **Surface Intersections.** Preliminary alternatives included replacing the rotaries at Kelley Circle, Murray Circle and Shea Circle with some combination of surface intersections. To the degree possible, these intersection layouts approximated the original Olmsted design, with changes made to improve traffic safety and traffic operations. Several configurations were reviewed at each rotary, including different numbers of approach lanes and different strategies for accommodating turning movements. Most of the alternatives reviewed entailed signalized intersections. Signalized intersections provide some advantages relative to rotaries and modern roundabouts, especially for landscape restoration and accommodation of pedestrians and bicycles:

- Pedestrians and bicycles can be provided with signal-protected crossings, instead of crossings that require motorists to yield.
- Signalized intersections tend to take up less space than rotaries or modern roundabouts, enabling the restoration of larger areas of green space.

However, signalized intersections also have some disadvantages relative to rotaries and modern roundabouts, especially for motor vehicle traffic:

- Signalized intersections do not process traffic as efficiently as rotaries or modern roundabouts.
- Signalized intersections often require more approach lanes than rotaries or roundabouts in order to compensate for their lower traffic capacity. This is an especially important concern for the Arborway Master Plan alternatives, since approaches to Kelley Circle and Murray Circle are constrained by the historic Olmsted landscape.
- Because they may require additional approach lanes, signalized intersections tend to have wider continuous paved areas than rotaries or roundabouts. This provides less tree cover at intersections, and can diminish the parkway character. It also presents pedestrians and bicyclists with wider continuous crossings.

- **Modern Roundabouts.** The preliminary alternatives analysis reviewed the feasibility of replacing each of the three rotaries with a modern roundabout. Modern roundabouts are similar in function to traditional rotaries, but they are significantly smaller. Modern roundabouts typically have narrower approach roadways, more oblique approach angles, narrower circulating roadways, and smaller diameter circles than traditional rotaries. As a result, vehicles must travel more slowly as they approach and travel through modern roundabouts. This improves pedestrian and bicycle access. Because vehicles travel more slowly, they are able to stop in less time and distance to allow pedestrians and bicycles to cross at the approaches to the roundabout. Bicycles that travel with the traffic through the rotary are more able to travel at speeds comparable to the motor vehicle speeds. The lower motor vehicle speeds also tend to reduce the severity of traffic accidents. By reducing the amount of pavement, modern roundabouts restored some green space (original Olmsted green space and otherwise). As an example, Figure 5-3 shows the contrast between the existing traditional rotary at Murray Circle and Murray Circle redesigned as a modern roundabout.

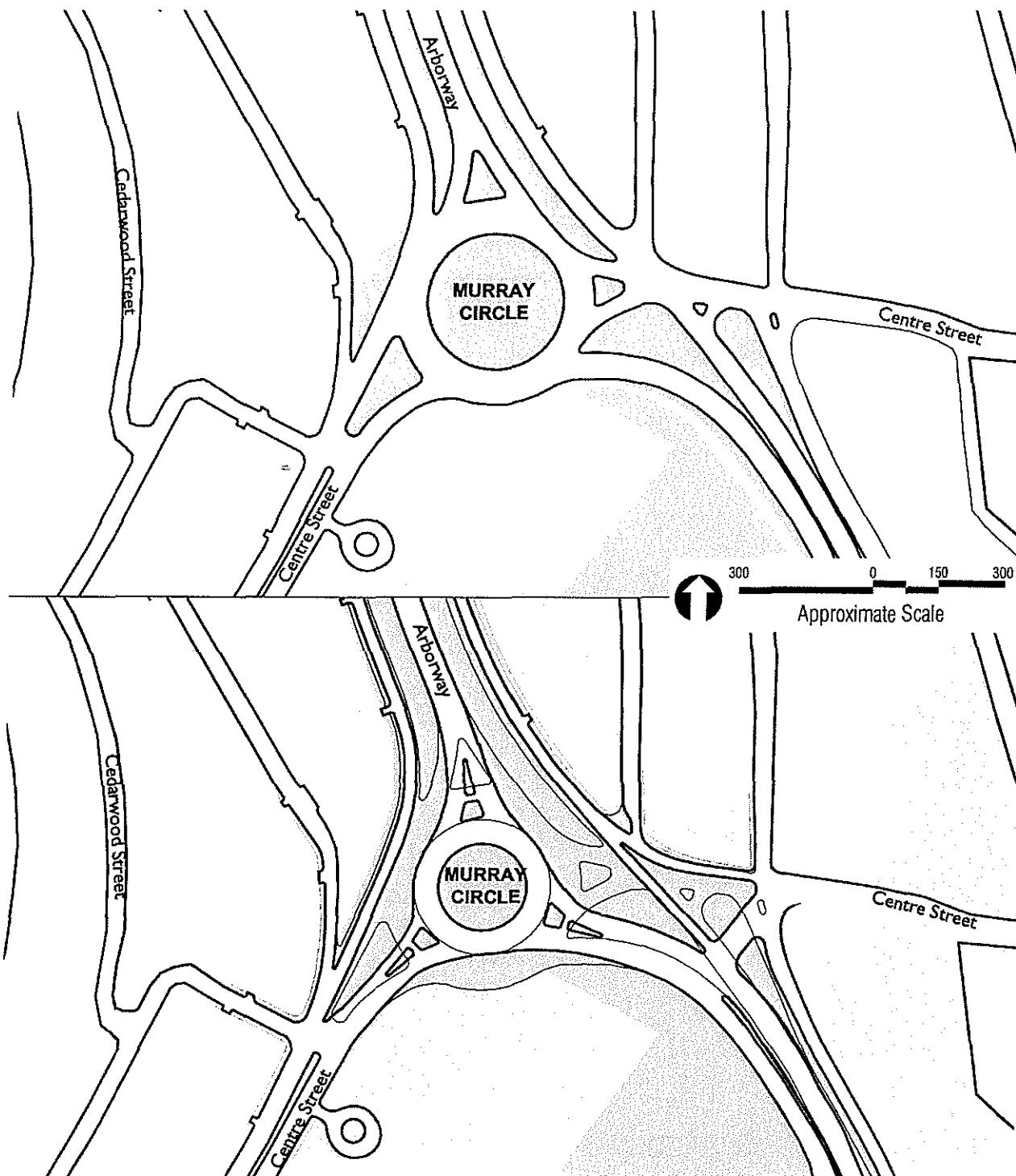


Figure 5-3 Existing Traditional Rotary (top), Modern Roundabout (bottom)

- **Grade Separation.** The preliminary alternatives analysis also reviewed grade-separated alternatives (i.e. underpass or overpass). A grade-separated solution at any of the rotaries would require the destruction of extant Olmsted landscape, and would have very high costs. As a result, alternatives that involved grade separation at either Kelley Circle or Murray Circle were rejected.

## **Design Alternatives**

Two alternatives were advanced for detailed design development and traffic operations analysis for the section of the Arborway between Kelley Circle and Murray Circle. These alternatives include one that replaces Kelley Circle and Murray Circle each with smaller “modern roundabouts,” and one that replaces Kelley Circle and Murray Circle each with a system of signalized intersections. The following are descriptions of the alternatives:

### **Alternative 1 – Roundabouts**

Alternative 1 replaces the large Kelley Circle and Murray Circle rotaries with smaller modern roundabouts. Figure 5-4 shows Alternative 1 for the Kelley Circle to Murray Circle segment, Figure 5-5 shows the area immediately around Kelley Circle, and Figure 5-6 shows the area immediately around Murray Circle.

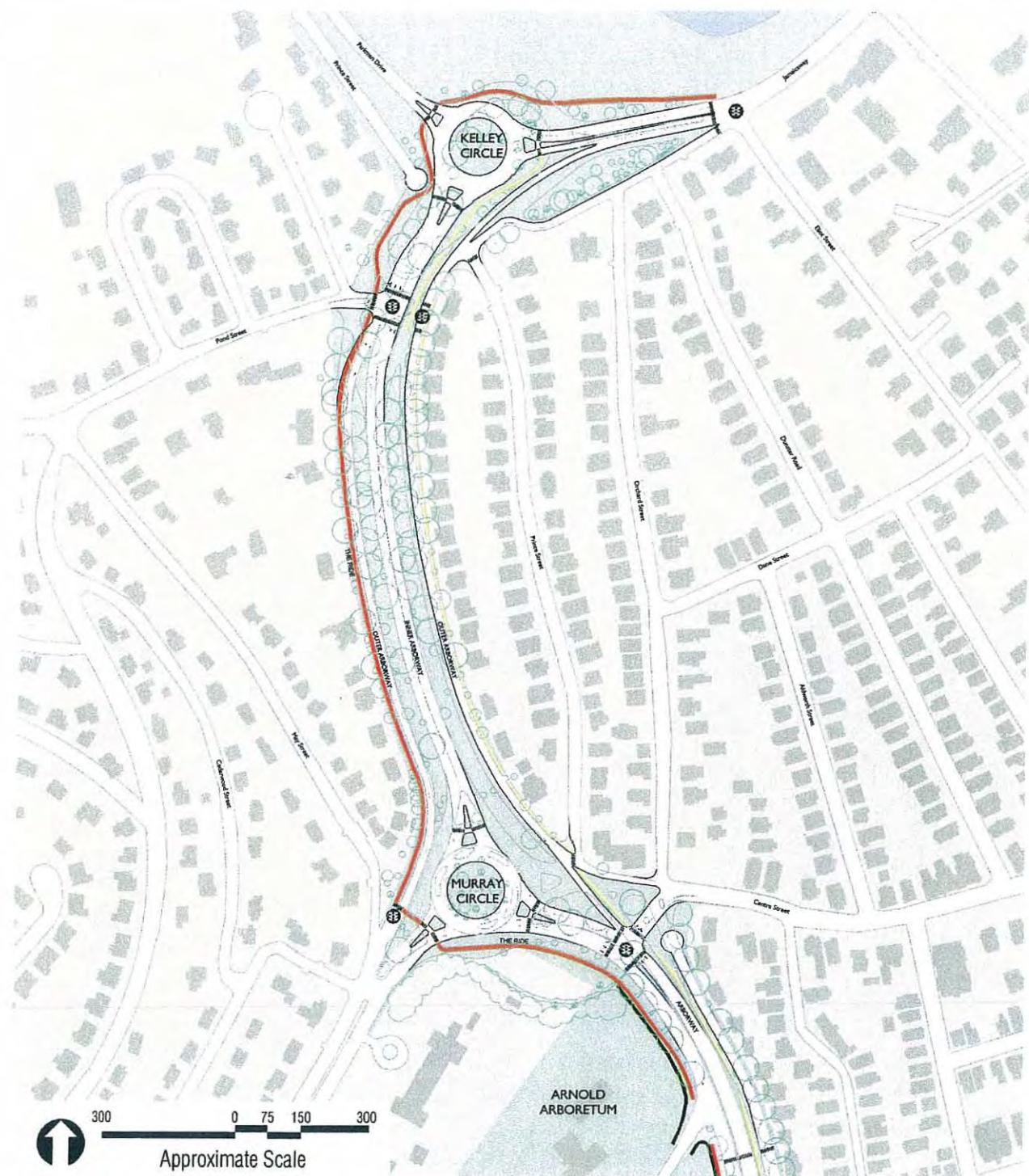


Figure 5-4 Alternative I – Roundabouts – Kelley Circle to Murray Circle

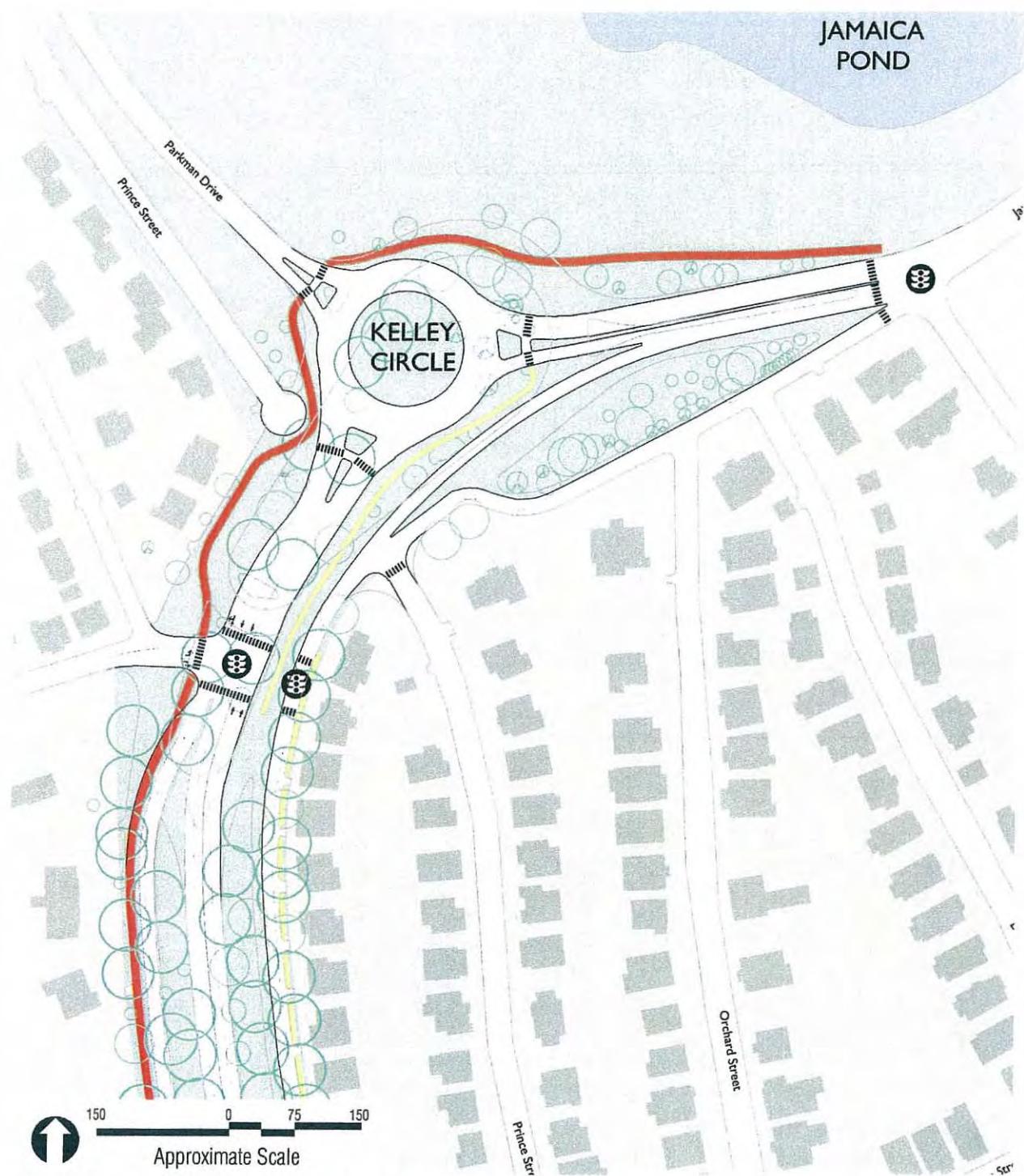
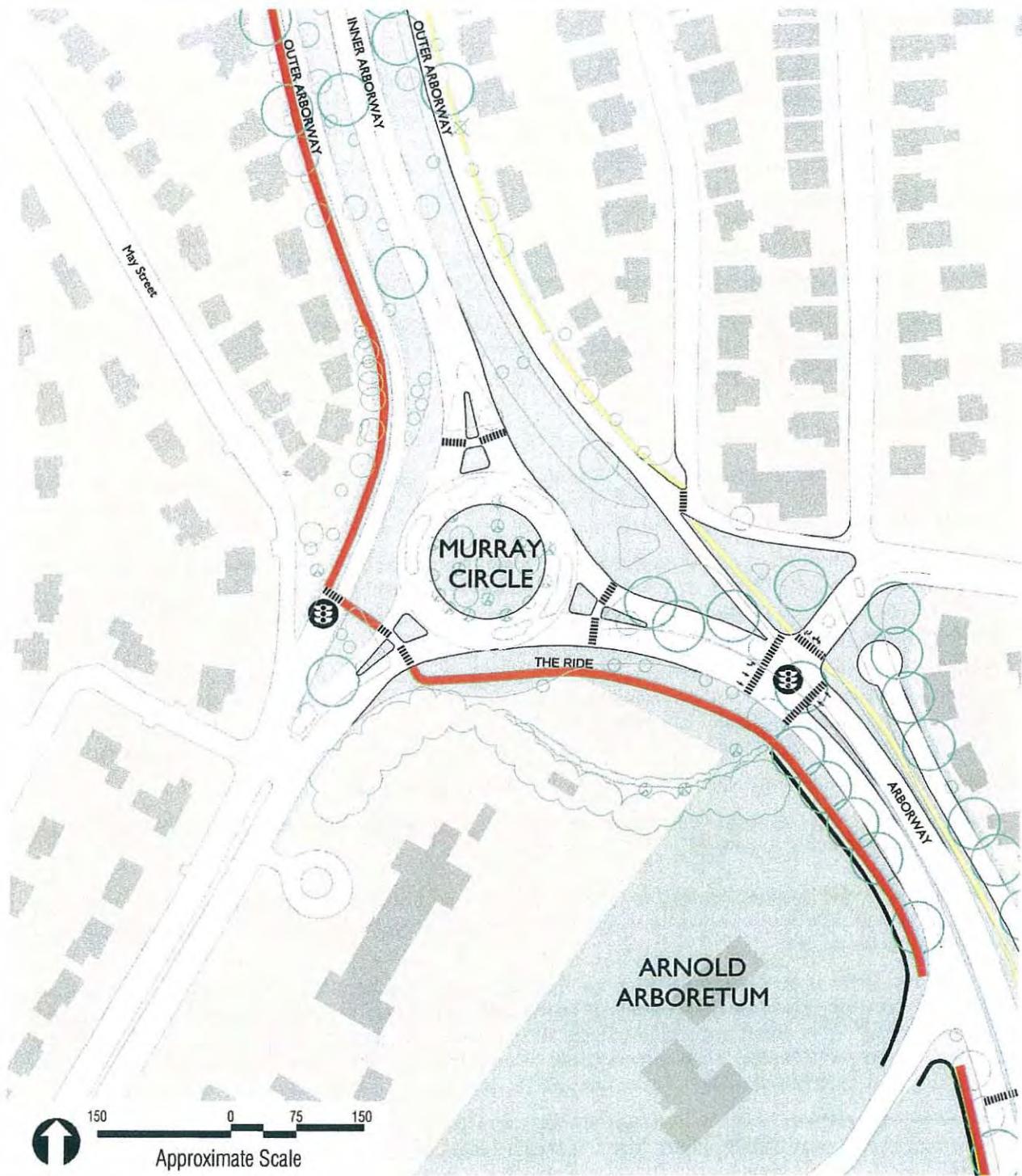


Figure 5-5 Alternative I – Roundabouts – Kelley Circle



**Figure 5-6 Alternative I – Roundabouts – Murray Circle**

Alternative 1 restores landscape, including some elements of the lost Olmsted landscape, and improves pedestrian and bicycle accommodation by reducing the amount of pavement and the controlling vehicular access. In particular, vehicular access to and from the Outer Arborway roadways is limited. The signalized intersection of Arborway / Centre Street is relocated to the south in order to reduce the interaction between this intersection and Murray Circle. Alternative 1 has the following characteristics:

## **Historic Landscape**

- A significant amount of pavement is eliminated and replaced with green space. Some of this green space is lost Olmsted landscape, while other space was not park space in the original Olmsted design. The enhanced green space enables planting many new avenue trees along the edges of the roadways, in keeping with the Olmsted Arborway character.

## **Pedestrian and Bicycle**

- A continuous shared-use pedestrian / bicycle path is provided along the western edge of the Outer Arborway Southbound, in space that is regained from paved area of the Outer Arborway Southbound.
- Pedestrian and bicycle roadways crossings are improved, through signal protection, shorter crossings, and lower vehicle design speeds. This includes a new signal at Eliot Street, which provides a protected crossing between the Pondside neighborhood and Jamaica Pond.

## **Motor Vehicle**

- Both large rotaries at Kelley Circle and Murray Circle are replaced with “modern roundabouts.” The redesigned roundabouts at Kelley Circle and Murray Circle have comparable traffic operations characteristics as the existing rotaries, but the smaller radius turns require lower vehicle speeds.
- Northbound left turns are prohibited from Arborway onto Pond Street. In order to provide acceptable traffic operations, northbound Arborway traffic must circulate around Kelley Circle, head southbound, and turn right onto Pond Street. This is comparable to the current traffic movement from the Arborway northbound to Pond Street via Kelley Circle.
- Westbound left turns are prohibited from Centre Street westbound onto Arborway southbound. In order to provide acceptable traffic operations, westbound Centre Street traffic must circulate around Murray Circle to reach Arborway southbound. This movement has low volumes, and it is similar to the existing connection, which requires Centre Street traffic to circulate around Murray Circle to reach the Arborway southbound.
- Outer Arborway Southbound and Outer Arborway Northbound are reduced to one lane each.
- Some traffic is diverted from the Outer Arborway roadways to the Inner Arborway by controlling access to and from the Outer Arborway roadways.
  - Outer Arborway Southbound provides access only for local traffic and to Centre Street westbound. This reduces peak hour traffic on the Outer Arborway Southbound by approximately 45%, and enables it to be narrowed to one lane.
  - Parkman Drive is accessible only from the Inner Arborway, not from the Outer Arborway Northbound. Outer Arborway Northbound provides local access, and access from the Arborway northbound (adjacent to the Arnold Arboretum) and Centre Street westbound (from Jamaica Plain center) through to the Jamaicaway northbound. This reduces peak hour traffic on the Outer Arborway Northbound by approximately 30%, and enables it to be narrowed to one lane.
- The eastern end of Prince Street, adjacent to Parkman Drive at Kelley Circle, is turned into a dead end. Traffic on Prince Street is low, and the Prince Street approach cannot be safely incorporated into the Kelley Circle design.
- The northern end of Upper Arborway is turned into a dead end. Because of the proximity of the signalized Centre Street / Arborway intersection, queues on Centre Street could block traffic exiting from Upper Arborway and create traffic flow problems.

Table 5-1 summarizes the principal advantages and disadvantages of Alternative 1.

**Table 5-1 Alternative I – Kelley Circle to Murray Circle – Advantages and Disadvantages**

	Advantages	Disadvantages
<b>Historic Landscape</b>	<ul style="list-style-type: none"> <li>Restoration of Olmsted landscape, especially near Jamaica Pond</li> <li>Creation of new (non-Olmsted) green space around Kelley Circle and Murray Circle</li> <li>Retention of historic parkway alignment between Kelley Circle and Murray Circle</li> <li>Retention of parkway character (roundabouts enable narrower intersection approaches, better tree canopy)</li> </ul>	<ul style="list-style-type: none"> <li>Wider intersection at Arborway / Pond Street may diminish tree canopy, parkway character at this location</li> </ul>
<b>Pedestrian and Bicycle</b>	<ul style="list-style-type: none"> <li>Continuous shared-use bicycle / pedestrian path with improved visibility and connectivity</li> <li>New signal-protected crossing at Eliot Street</li> <li>Signal-protected crossings improved at Pond Street and Centre Street (provide continuous protected crossings of whole Arborway corridor)</li> </ul>	<ul style="list-style-type: none"> <li>Bicycle / pedestrian path requires unprotected crossings: Parkman Drive at Kelley Circle and Centre Street at Murray Circle (vehicles must yield to pedestrians and bicycles)</li> </ul>
<b>Motor Vehicle</b>	<ul style="list-style-type: none"> <li>Traffic operations maintained at or near no-build levels in most locations</li> <li>Traffic operations improved for Outer Arborway Southbound</li> </ul>	<ul style="list-style-type: none"> <li>Traffic operations worsened somewhat during PM peak hour at Inner Arborway southbound approach to Murray Circle and Centre Street eastbound approach to Murray Circle</li> <li>Traffic operations worsened during AM peak hour at Parkman Drive approach to Kelley Circle</li> <li>Vehicular access controls complicate local access for Outer Arborway Northbound, Outer Arborway Southbound, Upper Arborway, Pondside neighborhood, Prince Street</li> </ul>

## Alternative 2 – Intersections

Alternative 2 replaces the large rotaries at Kelley Circle and Murray Circle with signalized intersections. Figure 5-7 shows Alternative 2 for the Kelley Circle to Murray Circle segment, Figure 5-8 shows the area immediately around Kelley Circle, and Figure 5-9 shows the area immediately around Murray Circle.



Figure 5-7 Alternative 2 – Intersections – Kelley Circle to Murray Circle

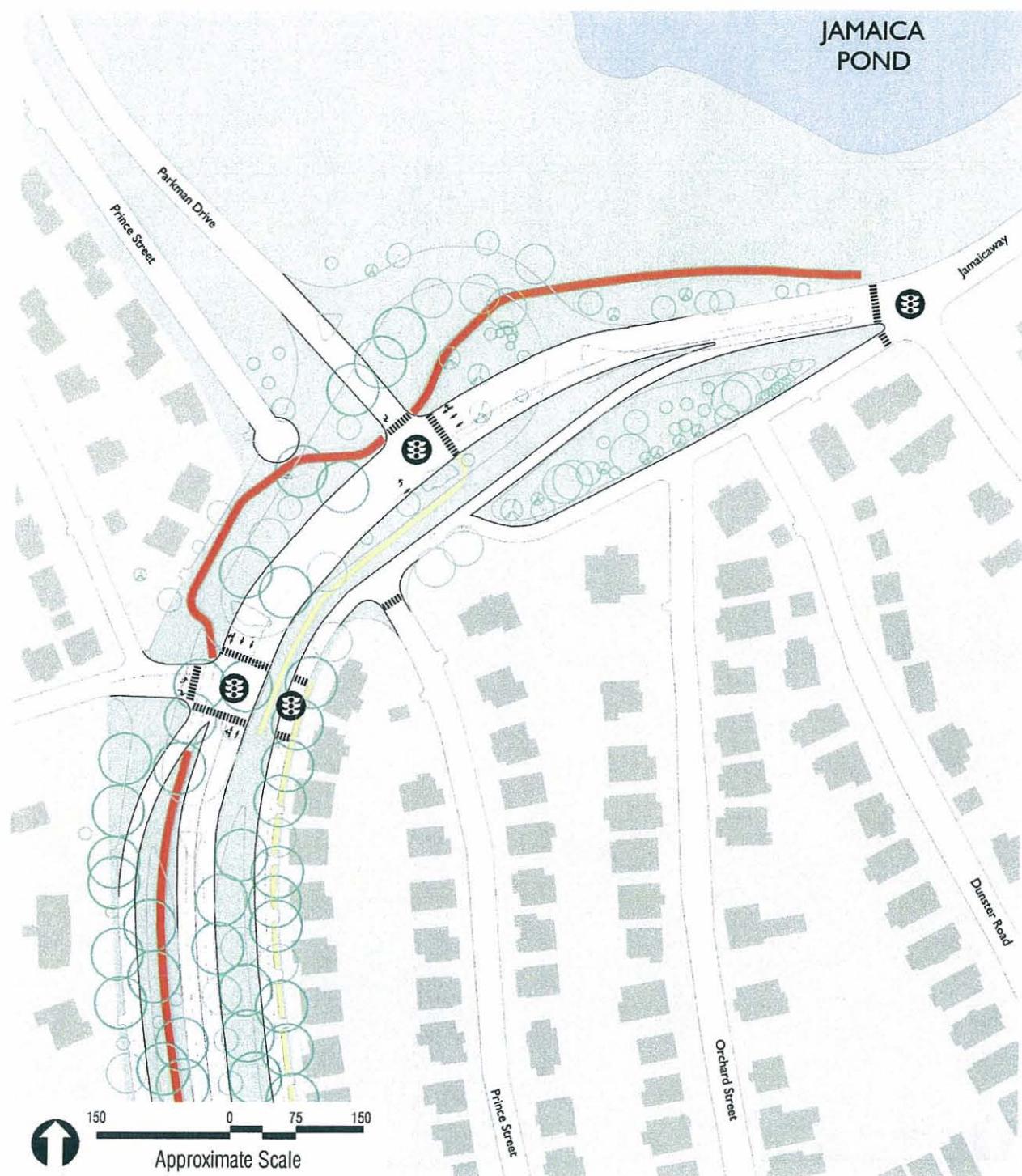
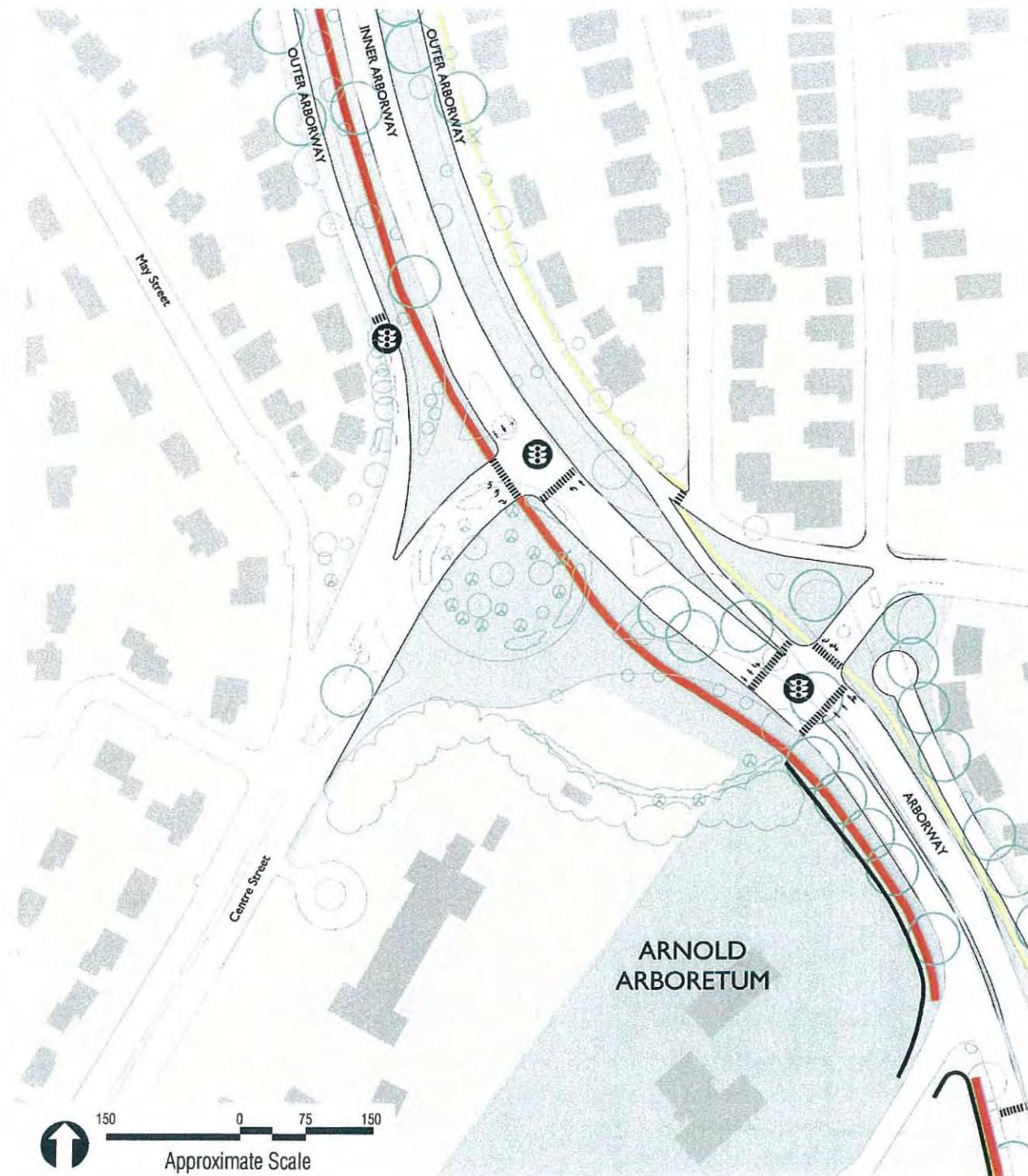


Figure 5-8 Alternative 2 – Intersections – Kelley Circle



**Figure 5-9 Alternative 2 – Intersections – Murray Circle**

Like the smaller, modern roundabouts of Alternatives 1, Alternative 2 eliminates pavement and restores green space. However, because the intersections are more compact than the modern roundabouts, and do not have inaccessible central islands, Alternative 2 provides more usable green space at the edges of the intersections. In addition, Alternative 2 provides signal-protected crossings for pedestrians and bicycles at the newly-created signalized intersections. The following are the principal characteristics of Alternative 2:

## Historic Landscape

- Alternative 2 eliminates a significant amount of pavement and replaces it with green space. Alternative 2 restores a particularly large amount of contiguous Olmsted green space adjacent to Jamaica Pond. New trees are planted along the edges of the roadways, in keeping with the Olmsted Arborway character.

## Pedestrian and Bicycle

- A continuous shared-use pedestrian / bicycle path is provided along the western median, between Outer Arborway Southbound and Inner Arborway. Locating the shared-use path in the median has some historic precedent, since “The Ride”, Olmsted’s bridle path, was originally located in the eastern median.
- All major roadway crossings have signal protection, including a new signal at Eliot Street, which provides a protected crossing between the Pondside neighborhood and Jamaica Pond.

## Motor Vehicle

- Both large rotaries at Kelley Circle and Murray Circle are replaced with a pair of signalized T-intersections.
- The close spacing of these intersections creates the potential for vehicle queues to back up between these intersections and create gridlock at the adjacent intersection. Traffic analysis indicates that this is likely to happen during some peak hour signal cycles.
- Outer Arborway Southbound and Outer Arborway Northbound are reduced to one lane each.
- Some traffic is diverted from the Outer Arborway roadways to the Inner Arborway by controlling access to and from the Outer Arborway roadways.
  - Outer Arborway Southbound provides access only for local traffic and to Centre Street westbound, reducing peak hour traffic by approximately 45% and enabling it to be narrowed to one lane.
  - Parkman Drive is accessible only from the Inner Arborway, not from the Outer Arborway Northbound. Outer Arborway Northbound provides local access, and access from the Arborway northbound (adjacent to the Arnold Arboretum) and Centre Street westbound (from Jamaica Plain center) through to the Jamaicaway northbound. This reduces peak hour traffic on the Outer Arborway Northbound by approximately 30%, and enables it to be narrowed to one lane.
- The eastern end of Prince Street, adjacent to Parkman Drive, is turned into a dead end. Traffic on Prince Street is low, and the Prince Street approach would be located too close to the new signalized intersection at Parkman Drive.
- The northern end of Upper Arborway is turned into a dead end. Because of the proximity of the signalized Centre Street / Arborway intersection, queues on Centre Street could block traffic exiting from Upper Arborway and create traffic flow problems.

Table 5-2 summarizes the principal advantages and disadvantages of Alternative 2.

**Table 5-2 Alternative 2 – Kelley Circle to Murray Circle – Advantages and Disadvantages**

	<b>Advantages</b>	<b>Disadvantages</b>
<b>Historic Landscape</b>	<ul style="list-style-type: none"> <li>Restoration of Olmsted landscape, especially near Jamaica Pond</li> <li>Creation of new (non-Olmsted) green space around Kelley Circle and Murray Circle</li> <li>Creation of more contiguous, usable green space due to smaller footprint of intersections relative to roundabouts</li> </ul>	<ul style="list-style-type: none"> <li>Signalized intersections require wider approaches than roundabouts, diminishing tree canopy, parkway character</li> </ul>
<b>Pedestrian and Bicycle</b>	<ul style="list-style-type: none"> <li>Continuous shared-use bicycle / pedestrian path with improved visibility and connectivity</li> <li>New signal-protected crossings at Eliot Street, Parkman Drive, Centre Street (western section)</li> <li>Signal-protected crossings enhanced at Pond Street and Centre Street (eastern section)</li> </ul>	<ul style="list-style-type: none"> <li>Many crossings are wider due to the need for additional lanes at the signalized intersections</li> </ul>
<b>Motor Vehicle</b>	<ul style="list-style-type: none"> <li>Signalized intersections provide right of way for vehicular traffic, benefiting minor streets that currently have high levels of delay</li> <li>Traffic operations, delay improved at several locations <ul style="list-style-type: none"> <li>Arborway / Pond Street</li> <li>Outer Arborway Southbound</li> <li>Arborway / Centre Street (eastern section)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Traffic operations worsened during PM peak hour at Arborway / Centre Street (western section)</li> <li>Potential queuing and gridlock due to high traffic volumes, closely-spaced intersections</li> <li>Vehicular access controls complicate local access for Outer Arborway Northbound, Outer Arborway Southbound, Upper Arborway, Pondside neighborhood, Prince Street</li> </ul>

The traffic operations for these four alternatives, as well as Existing Conditions and Future No-Build Conditions are summarized in Appendix E. The traffic analysis summaries (Synchro analysis for the signalized and unsignalized intersections, Sidra analysis for the rotaries) are also included in Appendix E.

The following are the major findings and trade-offs between Alternative 1 and Alternative 2:

- By utilizing roundabouts at Kelley Circle and Murray Circle rather than signalized intersections, Alternative 1 offers a traffic operations advantage over Alternative 2.
- By providing more signal-protected crossings, Alternative 2 offers a pedestrian and bicycle access advantage over Alternative 1. This is especially important for the continuous shared-use pedestrian / bicycle path, since this will be the major pedestrian and bicycle route along the Arborway, and the route that will be used largely by recreational users unfamiliar with the neighborhood.
- In order to better organize and control traffic flows, pavement area and freedom of movement in the Kelley Circle to Murray Circle segment have been reduced. Access to and from the Outer Arborway Southbound, Outer Arborway Northbound, the Pondside neighborhood, and the Upper Arborway is affected. As a result, local access to adjacent streets and homes becomes more circuitous. This is a significant issue for all of the alternatives.
- Alternative 1 has somewhat better local access than the other alternatives. By circulating around Kelley Circle, traffic in Alternative 1 can turn right onto Eliot Street to enter the Pondside neighborhood.

## 5.2.2 Arborway Adjacent to the Arboretum

### Design Objectives

This section of the Arborway was altered slightly from the original Olmsted design. Along the eastern edge of the Arborway, “The Ride,” Olmsted’s bridle path, was eliminated in order to widen the pavement. This eliminated a row of avenue trees between the Arborway and the Upper Arborway. More of the original avenue trees were eliminated further south, near the Forest Hills Gate to the Arboretum, when the roadway was widened to accommodate the Casey Overpass and the ramps to and from South Street. Otherwise this segment of the Arborway retains much of its original character. In addition, there are no cross-streets or intersections in this section of the Arborway, and no locations with significant traffic congestion. Therefore, there is no need for major roadway changes in this section, nor any significant opportunity for alterations due to the presence of extant landscape features.

As a result, the proposed improvements in this section of the Arborway focus on restoration of lost landscape and tree plantings, and improving the pedestrian and bicycle connections. Pedestrian and bicycle enhancements include the creation of a shared-use bicycle / pedestrian path along the western side of the Arborway, between the roadway and the Arnold Arboretum wall, and providing a continuous sidewalk on the eastern side of the Arborway.

### Historic Landscape

- This segment of the Arborway was altered from the original Olmsted design when the roadway was widened to encompass the Ride, the original bridle path. However, this was not as significant an alteration of the historic landscape as those made at the rotaries and at the Casey Overpass.
- The widening of the roadway eliminated many of the heritage oak trees between the Arborway and the Upper Arborway.
- Many heritage trees are extant in this section. There are regular lines of heritage trees along the Arboretum frontage (on the west side of the Arborway) and along the eastern side of the Upper Arborway.
- The Casey Overpass eliminated several heritage trees from the southern portion of this segment, from slightly north of the Forest Hills Gate to South Street.

### Pedestrian and Bicycle

- There is a wide sidewalk adjacent to the Arboretum wall. The space available between the Arboretum wall and the row of heritage trees is wide enough to accommodate a shared-use bicycle-pedestrian path.
- There are no pedestrian crossings between the Casey Overpass and the Arboretum’s Hunnewell Gate. This section has a significant curve, and sight lines are not good along much of this section, so no additional crossings are recommended.

### Motor Vehicle

- The segment of the Arborway adjacent to the Arboretum is a fairly long stretch of roadway uninterrupted by cross streets.

### Improvement Alternatives

The Master Plan recommends a number of landscape improvements and pedestrian and bicycle enhancements, including the restoration of many of the lost avenue trees and the creation of the continuous shared-use pedestrian / bicycle path adjacent to the Arboretum wall.

The alternatives analysis also reviewed potential improvements to the signalized pedestrian crossing at the Arnold Arboretum’s main Hunnewell Gate.

**Pedestrian Signal at Hunnewell Gate.** The signalized pedestrian crossing of the Arborway mainline at the Arboretum's main Hunnewell Gate provides an important pedestrian connection between the residential neighborhood and the Arboretum across the heavy Arborway traffic. Therefore, this signalized crossing should be retained, and its visibility should be improved.

However, this crossing only provides a protected crossing of the Arborway mainline, not the adjacent Upper Arborway (a much lower-volume roadway). To complete the crossing of the full Arborway corridor, it is necessary to cross the Upper Arborway via an unsignalized crossing. Residents have complained that pairing the signalized crossing with the unsignalized crossing creates a confusing and unsafe situation.

However, signalizing the Upper Arborway crossing is not recommended. There are two options for signalizing the Upper Arborway. The first option would be to put the Arborway mainline and the Upper Arborway under the same signal control to provide a single crossing phase from the Arboretum to the opposite side of the Upper Arborway.

The Arborway corridor is very wide: it is approximately 110 feet from the edge of the pavement adjacent to the Arboretum to the edge of the pavement on the eastern side of the Upper Arborway. In order to allow pedestrians to cross the entire corridor in one signal phase, that phase would have to be about 35 seconds long (assuming a pedestrian walking speed of 3.5 feet per second). This very long signal phase could exacerbate existing signal compliance problems among drivers.

The other option would entail installing a second pedestrian signal for the Upper Arborway only, and requiring that pedestrians press two crossing buttons: one to cross the Arborway mainline and one to cross the Upper Arborway. This could actually increase the confusion about the crossing, since pedestrians would see that both crossings are signalized, and would expect that actuating one signal would enable pedestrians to cross the entire corridor. In addition, the pedestrian signal heads for both crossings would be aligned with each other, which could also cause confusion. The separate actuation and signalization of these two crossings could result in pedestrians mistakenly crossing a high-speed roadway without the right of way.

In addition, traffic volumes on the Upper Arborway are quite low. In existing conditions, the AM peak hour is the hour of highest demand on the Upper Arborway, with approximately 220 vehicles traveling northbound (most likely local traffic avoiding congestion on the northbound Arborway mainline). Combining the northbound traffic with approximately 50 southbound vehicles still results in only about 4 – 5 vehicles per minute along the Upper Arborway during the AM peak hour, the period of highest demand. During the PM peak hour, total demand both ways is only about 150 vehicles per hour, or 2 – 3 vehicles per minute. These low traffic volumes provide very frequent traffic gaps for pedestrians. It is likely that most pedestrians would not bother to actuate a pedestrian signal, or wait for the light to change.

A third alternative for improving the Upper Arborway crossing is to leave it unsignalized, but provide pedestrians and motorists with better notice about the crossing. The median between the Arborway mainline and the Upper Arborway is fairly wide at 15 feet, and provides the opportunity for signs in each direction notifying pedestrians about the upcoming crossing. The crossing could also be made more visible to drivers by providing a raised crosswalk and enhancing the pavement markings.

### 5.2.3 Forest Hills Area / Casey Overpass

#### Design Objectives

The Forest Hills section of the Arborway has been significantly altered. Potential improvements in the area are also constrained by the presence of the Forest Hill MBTA station, the Orange Line, and the existing surface streets, which provide important connections for the surrounding neighborhood and for MBTA buses.

#### Historic Landscape

- This segment of the Arborway has been significantly altered by the construction of the Casey Overpass, the elimination of the elevated Orange Line, and the creation of the Southwest Corridor.
- Most of the heritage trees have been eliminated, although a few remain.
- The surface streets retain more of the original Arborway landscape character than the Casey Overpass.

#### Pedestrian and Bicycle

- Pedestrian and bicycle access through the area is available via the sidewalks on the Casey Overpass or via surface streets and sidewalks.
- The crossings to and from the Casey Overpass sidewalks are not well marked.
- The continuous shared-use bicycle / pedestrian path should be located along the surface, not on the Casey Overpass. Locating the path on the surface provides access to important pedestrian and bicycle destinations, including South Street, the Southwest Corridor Park, Forest Hills MBTA Station, and Washington Street.
- The continuous shared-use bicycle / pedestrian path should take advantage of signal-protected crossings wherever possible, and should pass through the sections of the Arborway corridor that retain the best parkway connections.

#### Motor Vehicle

- The surface intersections in the area (South Street / Washington Street / New Washington Street / Arborway Ramps and Arborway / Washington Street / New Washington Street / Hyde Park Avenue) accommodate heavy traffic and high volumes of pedestrians traveling to and from the Forest Hills MBTA station. The South Street / Washington Street / New Washington Street / Arborway Ramps intersection in particular is highly congested.
- Both of these surface intersections are physically constrained by the Casey Overpass, the Forest Hills MBTA Station, the 500 Arborway MBTA Operations facility, the bridge over the Orange Line tracks, and adjacent buildings. Because Forest Hills MBTA Station is a major bus hub, these intersections must also accommodate high volumes of bus movements, which require wide turning radii. In addition, these intersections will be affected by the developing designs for the Arborway Yard bus garage and maintenance facility and by the Arborway trolley restoration. As a result, there is limited potential for geometric changes to either intersection.

#### Preliminary Alternatives

The construction of Casey Overpass dramatically changed the character of the Arborway's historic landscape in the Forest Hills area. While removal of the overpass would greatly enhance the historic character of the Arborway, there are many constraints in the Forest Hills area that make dramatic changes difficult to achieve. They include the Forest Hills MBTA station, bus routes connecting to Forest Hills Station and the Arborway Yard Facility, the proposed Arborway trolley restoration, the depressed railroad tracks, the New Washington Street bridge over the railroad tracks, and current property limits/ownership. Because the Casey Overpass dominates this section of the Arborway, and its presence severely limits the potential for landscape improvements, the preliminary alternatives focused on removal or replacement of the Casey Overpass. The following principal alternatives were considered:

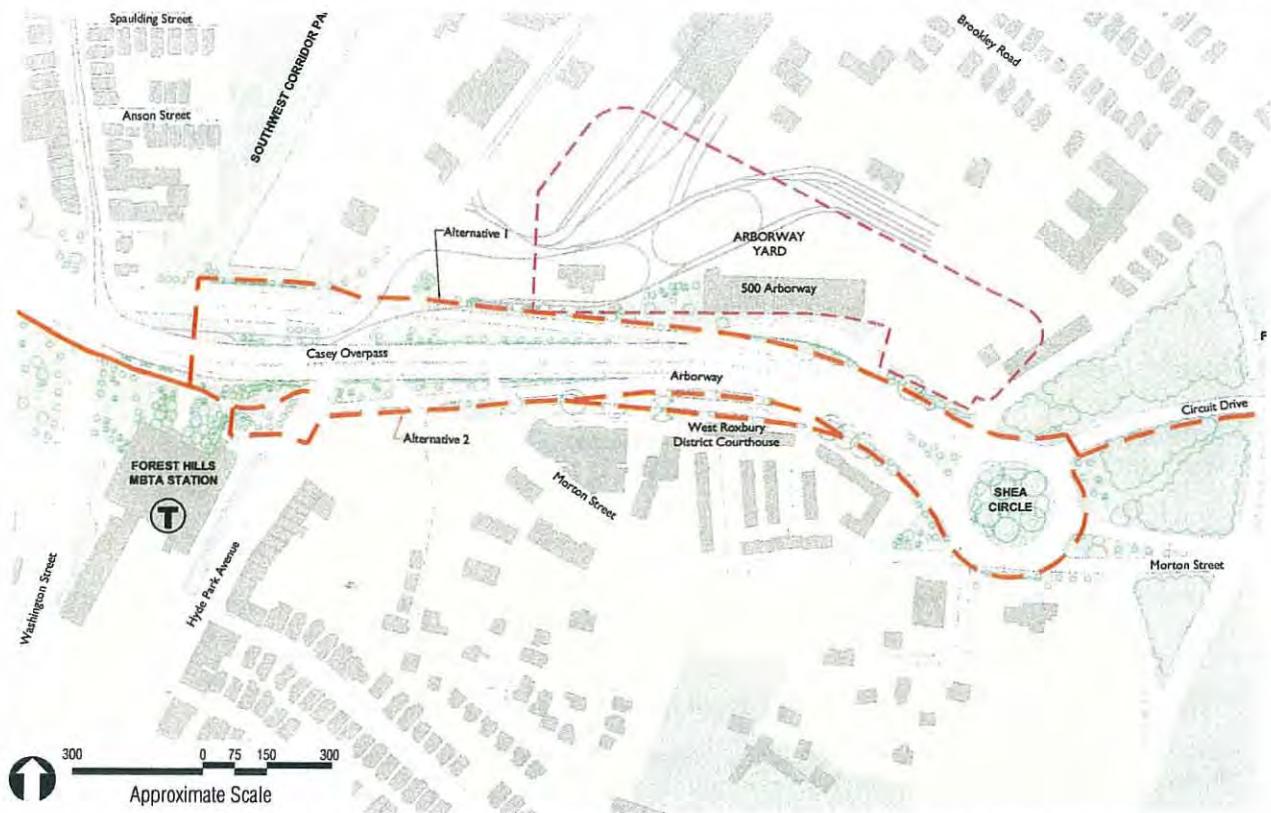
- **Removal of the Casey Overpass.** The Casey Overpass carries heavy traffic volumes: approximately 34,000 vehicles per day, and approximately 2,500 vehicles per hour during morning and afternoon peak hours. This is about two or three times the volumes currently accommodated on the parallel surface streets, Arborway and New Washington Street. Removing the Casey Overpass and displacing the traffic to these surface streets would more than triple traffic volumes. Due to the heavy cross-traffic on South Street – Washington Street and Washington Street – Hyde Park Avenue under the Casey Overpass, accommodating this traffic on the surface streets would create unacceptable congestion. If the surface streets were widened to accommodate this traffic in even a marginal manner, the Arborway and New Washington Street in this corridor would have to be seven or eight lanes wide. This would be undesirable from an urban design standpoint, and have unacceptable impacts on the Forest Hills Station. Therefore, this option was rejected.
- **Replacement of the Casey Overpass with a Depressed Tunnel.** In order to accommodate the heavy traffic using the Casey Overpass, the grade-separated overpass could be replaced with a grade-separated underpass. Such an underpass would need to pass beneath the surface roadways and beneath the railroad tracks, and provide connections to the Shea Circle in the southeast and to the Arborway adjacent to the Arboretum to the north. Assuming a maximum 5% grade, this underpass would require approaches of approximately 1,200 feet to the east and 1,700 feet to the northwest in order to descend to the necessary depth below the railroad tracks. This would result in a tunnel beginning near Shea Circle in the southeast and near the Hunnewell Gate to the northwest. Such a tunnel would be very expensive, and would have major impacts on the Arborway's remaining historic landscape. Therefore, this option was rejected.
- **Reconstruction of the Casey Overpass.** The Casey Overpass could be rebuilt as a lower, narrower, and structurally lighter overpass. However, this alternative would be prohibitively expensive, would result in significant construction impacts, and an elevated structure would still remain within the historic Arborway corridor. Therefore, such a costly alternative is not justified, and this option was also rejected.

Improvements to the existing Casey Overpass and landscape enhancements in the remaining green space adjacent to the viaduct were also considered. These are discussed in more detail below.

### Design Alternatives

The historic Arborway corridor in the Forest Hills area, between South Street and Shea Circle, is dominated by the Casey Overpass. As discussed above, the Casey Overpass cannot be eliminated given the Arborway Master Plan's objectives and study parameters. Combining the need to retain the Casey Overpass with the other constraints in this area, significant roadway changes are not feasible. However, there are opportunities for landscape enhancements and improvements to the pedestrian and bicycle environment.

In developing a plan for the continuous shared-use bicycle / pedestrian path, two alignments were reviewed for the Forest Hills section of the corridor. Figure 5-10 shows the alternative alignments for the shared-use path through the Forest Hills area.



**Figure 5-10 Alternative Alignments for the Shared-Use Path through Forest Hills**

From the Arboretum, the shared-use bicycle / pedestrian runs along the western edge of the Arborway, between the Arborway mainline and the Arboretum wall, in the location of the existing wide sidewalk. As it approaches the Forest Hills area, it runs along the edge of the Arboretum off-ramp and crosses Washington Street into the Forest Hills MBTA station property. At this point, there are two basic alternatives for the shared-use bicycle / pedestrian path:

- Alternative 1, along the northern edge of the Arborway (north of the Casey Overpass):
  - Underneath the Casey Overpass, across New Washington Street at the signalized crossing at the Southwest Corridor Park.
  - Across Washington Street at the northern signal-protected crossing at the intersection of Washington Street / Surface Arborway / Hyde Park Avenue / New Washington Street.
  - Along the northern edge of the surface Arborway, adjacent to the 500 Arborway MBTA Operations facility.
  - Across the Forest Hills Street approach to the Shea Circle Rotary to enter Franklin Park at Circuit Drive.
- Alternative 2, along the southern edge of the Arborway (south of the Casey Overpass):
  - In front of the Forest Hills Station.
  - Across Hyde Park Avenue at the signalized crossing near the station entrance.
  - Along the southern edge of the Surface Arborway eastbound in front of the West Roxbury District Courthouse.
  - Along the southern outer edge of Shea Circle and across the Morton Street leg of the rotary to enter Franklin Park at Circuit Drive.

### **5.2.4 Shea Circle**

The Shea Circle area has been altered significantly from the original Olmsted design. The original design included a parkway approach and gateway to Franklin Park that have been destroyed by the Casey Overpass and the rotary. The original roadway alignments were changed in order to emphasize the major traffic connection between Morton Street and the Casey Overpass. The Casey Overpass and the large, high speed Shea Circle rotary combine to create a major obstacle for pedestrians and bicyclists attempting to reach Franklin Park.

#### **Design Objectives**

#### **Historic Landscape**

- The historic landscape was changed significantly to accommodate the Casey Overpass and the Shea Circle rotary, though some heritage trees remain in this location.

#### **Pedestrian and Bicycle**

- The Casey Overpass is a visual and physical barrier between Franklin Park and Forest Hills Station, and the large volume of high-speed traffic in the Shea Circle rotary creates another obstacle for pedestrians and bicycles.
- The shared-use bicycle / pedestrian path should enter Franklin Park at Circuit Drive.
- The shared-use bicycle / pedestrian path should continue into Franklin Park as an off-street path, and it should be integrated into Franklin Park's system of bicycle and pedestrian paths.

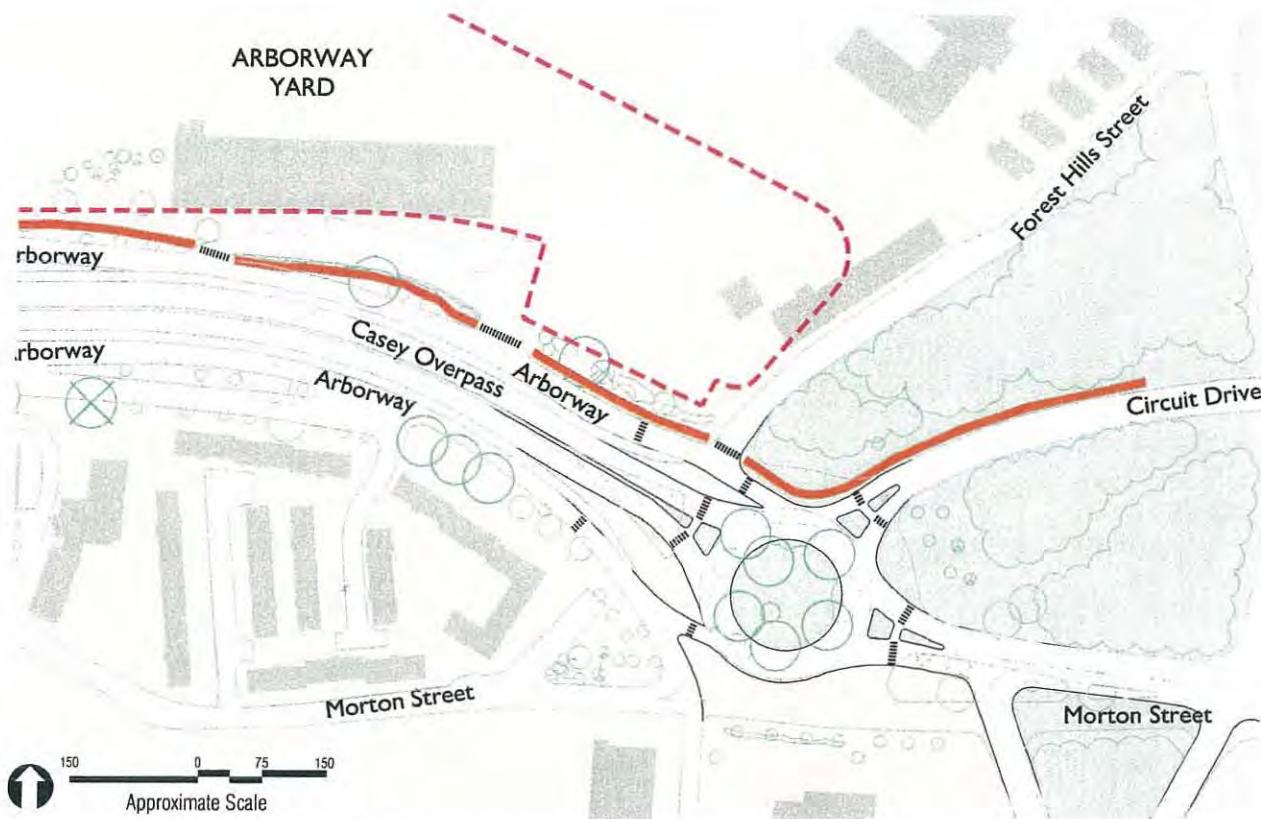
#### **Motor Vehicle**

- Shea Circle is a large rotary, with high vehicle speeds and short weaving sections.
- The heaviest traffic flows at Shea Circle are through-movements between Casey Overpass / Arborway and Morton Street. As a result, entering traffic does not experience as much resistance from circulating traffic. Because there are not high volumes of left turning traffic, a rotary may not be necessary to satisfy the traffic movements at Shea Circle.

#### **Design Alternatives**

Preliminary alternatives investigated at Shea Circle were discussed above, in conjunction with the discussion about preliminary alternatives for the other rotaries, Kelley Circle and Murray Circle. The main preliminary alternatives considered at Shea Circle were restoration of the original Olmsted roadway design, a modern roundabout, and a signalized intersection.

The original Olmsted design was rejected because of unsafe roadway alignments, unacceptable traffic congestion, and inappropriate roadway connections (e.g. Morton Street to the east of Shea Circle carries 2,500 vehicles per hour, and should not be reconnected with Morton Street to the west, which carries fewer than 100 vehicles per hour). Two principal alternatives were analyzed at Shea Circle: one would replace the rotary with a modern roundabout, and the other would replace the rotary with a signalized at-grade intersection.



**Figure 5-11 Alternative I – Roundabout – Shea Circle**

### Alternative I – Roundabout

Alternative 1 replaces the large rotary at Shea Circle with a smaller “modern roundabout.” Figure 5-11 shows Alternative 1. Alternative 1 restores landscape, including some elements of the lost Olmsted landscape, and improves pedestrian and bicycle accommodation by reducing the amount of pavement and the controlling vehicular access. The following are the key attributes of this alternative:

#### Historic Landscape

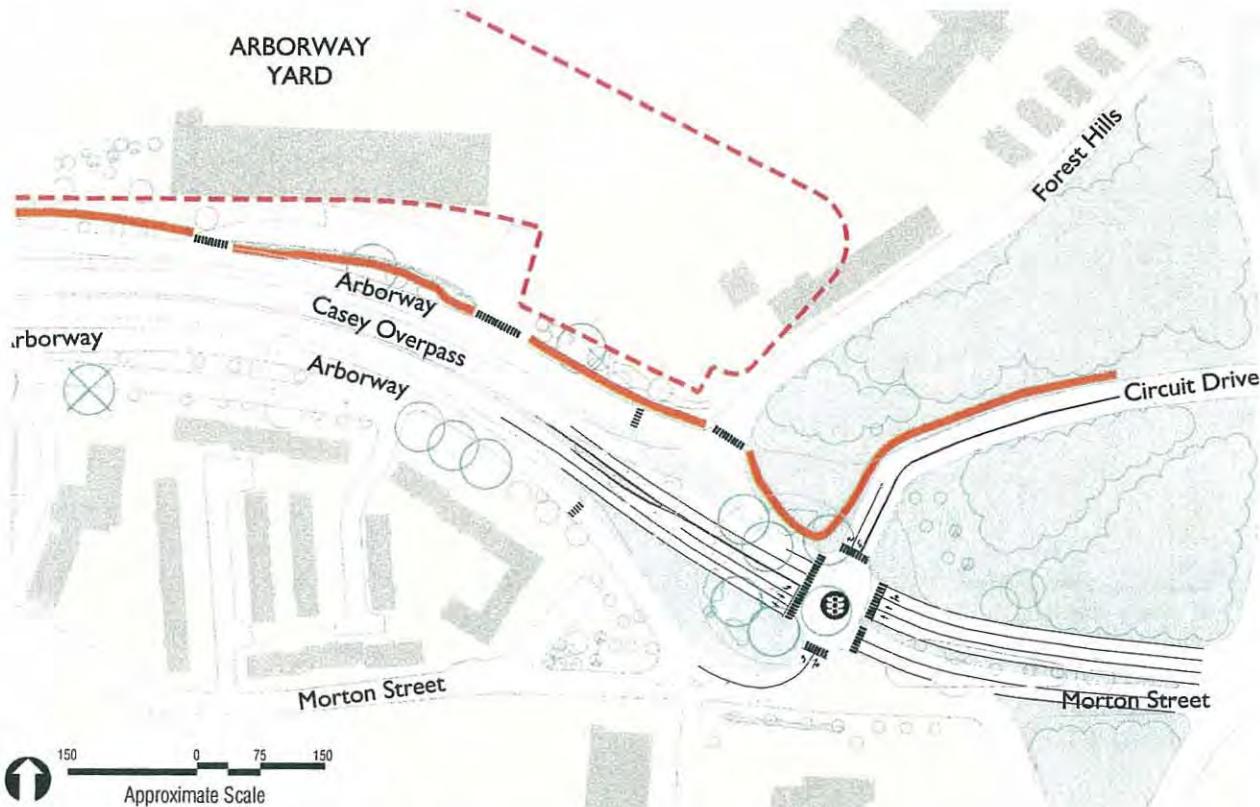
- Alternative 1 eliminates a significant amount of pavement and replaces it with green space. Some of this green space is lost Olmsted landscape, while other space was not park space in the original Olmsted design. The enhanced green space enables planting many new avenue trees along the edges of the roadways, in keeping with the Olmsted Arborway character.

#### Pedestrian and Bicycle

- A continuous shared-use pedestrian / bicycle path is provided along the northern edge of the Arborway corridor, between the Surface Arborway westbound and the MBTA’s 500 Arborway / Arborway Yard facility. The design of the shared-use path will be consistent with the design of the MBTA facility.
- Pedestrian and bicycle roadways crossings are improved, through shorter crossings and lower vehicle design speeds around the modern roundabout.

#### Motor Vehicle

- Forest Hills Street connects to the Surface Arborway westbound, and no longer connects directly to the roundabout. Traffic is still able to reach Forest Hills Street from the roundabout, and traffic from Forest Hills Street can reach the roundabout via Cemetery Road and Morton Street.
- The short segment of Morton Street behind the courthouse is accessible only via Surface Arborway eastbound.



**Figure 5-12 Alternative 2 – Intersection – Shea Circle**

### **Alternative 2 – Intersection**

Alternative 2 replaces the large rotary at Shea Circle with a signalized intersection. Figure 5-12 shows Alternative 2. Like the smaller, modern roundabouts of Alternative 1, Alternative 2 eliminates pavement and restores green space. However, because the intersections are more compact than the modern roundabouts, and do not have inaccessible central islands, Alternative 2 provides more usable green space at the edges of the intersections. In addition, Alternative 2 provides signal-protected crossings for pedestrians and bicycles at the signalized intersection. However, because signalized intersections do not process traffic as efficiently as rotaries or roundabouts, Alternative 2 tends to increase overall congestion and delay for motor vehicles. The following are the principal characteristics of Alternative 2:

#### **Historic Landscape**

- Alternative 2 eliminates a significant amount of pavement and replaces it with green space. In particular, Alternative 2 restores a large amount of Olmsted green space on either side of the Circuit Drive entry to Franklin Park. New trees are planted along the edges of the roadways, in keeping with the Olmsted Arborway character.

#### **Pedestrian and Bicycle**

- A continuous shared-use pedestrian / bicycle path is provided along the northern edge of the Arborway corridor, between the Surface Arborway westbound and the MBTA's 500 Arborway / Arborway Yard facility. The design of the shared-use path will be consistent with the design of the MBTA facility.
- Pedestrian and bicycle roadways crossings are improved, through signal-protection and shorter crossings.

### **Motor Vehicle**

- Forest Hills Street connects to the Surface Arborway westbound, and does not connect directly to the principal intersection. Traffic is still able to reach Forest Hills Street from the intersection, and traffic from Forest Hills Street can reach the intersection via Cemetery Road and Morton Street.
- The short segment of Morton Street behind the courthouse is accessible only via Surface Arborway eastbound.

## **5.3 Alternatives Evaluation**

The improvement alternatives have been proposed, the impacts of the alternatives have been quantified, and the advantages and disadvantages of the alternatives have been defined. In the alternatives evaluation, the quantitative and qualitative characteristics of the alternatives are weighed, and the most beneficial alternatives are selected in order to identify the best Preferred Alternative.

Table 5-3 summarizes the impacts of the alternatives relative to the historic landscape, pedestrian / bicycle, and motor vehicle criteria. The subsequent section discusses the principal qualitative trade-offs between the alternatives.

**Table 5-3 Alternatives Evaluation Summary**

	Existing Conditions	Future No-Build	Alternative 1 (Roundabouts)	Alternative 2 (Intersections)
<b>Historic Landscape</b>				
Plantings <sup>1</sup>				
Heritage Shade Trees	147	123	127	120
Non-Heritage Shade Trees	424	376	507	525
Ornamental / Evergreen Trees	137	134	125	121
<b>Net Gain / Loss Shade Trees</b>		<b>-72</b>	<b>+63</b>	<b>+74</b>
<b>Pedestrian / Bicycle</b>				
Continuous Path	No	No	Yes	Yes
Guide Signs	No	No	Yes	Yes
Major Unsignalized Crossings on Principal Path	3 <sup>2</sup>	3 <sup>2</sup>	3 <sup>2</sup>	None
Other Major Unsignalized Crossings	3 <sup>3</sup>	3 <sup>3</sup>	None	None
<b>Motor Vehicle Traffic</b>				
Traffic Operations <sup>4</sup>				
Kelley Circle (Arborway NB / Jamaicaway SB / Parkman Drive EB)	AM	-- / D / B	-- / E / C	A / E / C
	PM	-- / A / F	-- / A / F	A / B / F
Pond Street / Arborway	AM	D	D	C
	PM	E	F	F
Murray Circle (Arborway NB / Arborway SB / Centre Street EB / Centre Street WB)	AM	-- / A - B / E / B	-- / A - C / F / B	E / B / F / -
	PM	-- / B - F / C / A	-- / B - F / C / A	B / F / F / -
Centre Street / Arborway	AM	E	E	D
	PM	B	C	C
Shea Circle (Circuit Drive SB / Casey Overpass EB / Arborway EB / Morton Street WB)	AM	F / A / A / A	F / A / A / B	F / A / A / B
	PM	A / A / E / A	A / A / F / A	B / A / F / A
Intersections at LOS E or F in AM or PM Peak Hour		7	8	7
Travel Time <sup>5</sup>				4
Delay by Approach (minutes)				
Kelley Circle	AM Southbound	0.6	1.1	1.2
	AM Northbound	0.0	0.0	0.1
	PM Southbound	0.1	0.2	0.2
	PM Northbound	0.0	0.0	0.1
Pond Street / Arborway	AM Southbound	0.1	0.1	0.4
	AM Northbound	0.2	0.2	0.3
	PM Southbound	0.7	1.0	2.1
	PM Northbound	0.1	0.1	0.1
Murray Circle	AM Southbound	0.3	0.4	0.3
	AM Northbound			1.2
	PM Southbound	5.4	7.1	3.5
	PM Northbound			2.0
Centre Street / Arborway	AM Southbound	0.0	0.0	0.2
	AM Northbound	1.3	1.6	1.2
	PM Southbound	0.0	0.0	0.4
	PM Northbound	0.3	0.3	0.5
Shea Circle	AM Southbound	0.1	0.1	0.1
	AM Northbound	0.1	0.2	0.3
	PM Southbound	0.1	0.1	0.1
	PM Northbound	0.1	0.1	0.5
<b>Total Travel Time (minutes)</b>	<b>AM Southbound</b>	<b>4.1</b>	<b>4.7</b>	<b>5.2</b>
	<b>AM Northbound</b>	<b>4.6</b>	<b>5.0</b>	<b>6.1</b>
	<b>PM Southbound</b>	<b>9.3</b>	<b>11.4</b>	<b>9.3</b>
	<b>PM Northbound</b>	<b>3.5</b>	<b>3.5</b>	<b>4.1</b>
				<b>7.0</b>
				<b>7.9</b>
				<b>8.1</b>
				<b>6.5</b>

<sup>1</sup> Assuming that dead trees and trees in poor health are removed in Future No-Build Condition

<sup>2</sup> Major unsignalized intersections on principal path: Parkman Drive at Kelley Circle, Centre Street at Murray Circle, Circuit Drive at Shea Circle

<sup>3</sup> Major unsignalized intersections not on principal path: Jamaicaway at Eliot Street, Arborway Southbound at Murray Circle, Morton Street at Shea Circle

<sup>4</sup> LOS for signalized intersection, or LOS for each approach for rotaries: NB/SB/EB/WB

<sup>5</sup> Travel time in minutes for travel along Arborway main route: Jamaicaway – Arborway – Casey Overpass – Morton Street (Forest Hills surface intersections are not included because improvements proposed do not affect traffic operations or travel time significantly)

## Kelley Circle to Murray Circle

The alternatives analysis for the section of the Arborway between Kelley Circle and Murray Circle revealed a number of key issues that facilitate the selection of a Preferred Alternative:

- Alternative 1 and Alternative 2 both create opportunities to replace dead and dying trees, to replace missing trees in the rows that line the parkways, and to extend the rows of avenue trees.
- Because modern roundabouts have central islands and narrower approaches than signalized intersections, Alternative 1 provides better tree canopy and parkway character than the intersection alternatives.
- Alternative 1 and Alternative 2 both reduce the number and width of unsignalized pedestrian / bicycle crossings.
- Alternative 1 does not provide signal-protected crossings for the shared-use bicycle / pedestrian path at all major crossings. It requires crossing roundabout approaches at Centre Street (at Murray Circle) and at Parkman Drive (at Kelley Circle). These two crossings require that vehicles yield to pedestrians.
- Alternative 1 and Alternative 2 both control motor vehicle traffic access to and from the Outer Arborway roadways, but these roadways continue to carry enough traffic so that congestion on the Inner Arborway is not excessive.
- Alternative 2 creates two new major signalized intersections in this section of the Arborway: one at Parkman Drive, and one at Centre Street (western segment, connecting to and from Roslindale and West Roxbury). These intersections require wide stretches of pavement that would diminish the tree canopy and the parkway character of the Arborway.
- The closely-spaced signalized intersections of Alternative 2 are expected to experience some queuing and gridlock problems during peak hours.
- Alternative 1 causes slight increases to congestion at some locations, although it reduces congestion for other movements. Alternative 1 causes overall travel time for the Arborway corridor to increase by approximately 10 – 20% relative to the future no-build condition (except for southbound travel during the afternoon peak hour, when travel time decreases by about 20%).
- Alternative 2 causes moderate increases to congestion at some locations, although it reduces congestion for other movements. Alternative 2 causes overall travel time for the Arborway corridor to increase by approximately 50 – 85% relative to the future no-build condition (except for southbound travel during the afternoon peak hour, when travel time decreases by about 30%).
- All of the alternatives complicate access to and from the Outer Arborway Northbound, Outer Arborway Southbound, Upper Arborway, and the Pondside neighborhood.

Considering all of these issues, Kelley Circle to Murray Circle Alternative 1 achieves the best combination of historic landscape preservation and restoration, pedestrian and bicycle access improvement, and motor vehicle operations and safety. Therefore, in this segment of the Arborway, Alternative 1 is the basis for the Preferred Alternative.

However, Alternative 1 still has a number of disadvantages. These include the retention of three major pedestrian / bicycle crossings that are not signal-protected, and the lack of roadway connection at the northern end of Upper Arborway at Centre Street. The Preferred Alternative addresses these issues.

## Forest Hills

The proposed alternatives do not entail significant changes to roadways or intersections in the Forest Hills segment of the Arborway corridor. However, there are two alternatives for the continuous bicycle / pedestrian path.

- Alternative 1, which runs along the northern edge of the Arborway (north of the Casey Overpass), is the most advantageous route for the continuous shared-use bicycle / pedestrian path. Once it crosses New Washington Street, Alternative 1 has a clear sight line to Franklin Park, and its major crossings are signal-protected.

- Alternative 2 for the shared-use bicycle / pedestrian path, along the southern edge of the surface Arborway on the south side of the Casey Overpass, is not as desirable for the following reasons:
  - Direct crossings from Forest Hills to the southern edge of the surface Arborway are not signal-protected, and the signal-protected crossings are not direct.
  - There is a fairly direct visual connection from Forest Hills to Franklin Park along the northern edge of the surface Arborway. The visual connection from the southern edge of the surface Arborway to Franklin Park is blocked by the Casey Overpass.
  - A shared-use bicycle / pedestrian path along the southern edge of the surface Arborway would pass in front of the courthouse. This would require that it pass across the wide courthouse entry and exit drives, or between the drop-off / pick-up area and the front door. Neither of these locations is desirable for a bicycle / pedestrian path.
  - The crossing from the southern edge of the Arborway across Shea Circle to Franklin Park requires following a long, indirect path and crossing Morton Street, which is a very high volume roadway.

### **Shea Circle**

Shea Circle Alternative 2, which replaces the rotary with a signalized intersection, has a number of advantages relative to the no-build condition and Alternative 1. Although the signalized intersection increases the overall delay for traffic relative to the existing rotary and the modern roundabout, Alternative 2 operates with acceptable levels of service during the commuter peak hours. In addition, it offers the following advantages over the existing rotary and over Alternative 1, the modern roundabout.

- The signalized intersection requires less pavement, and enables the restoration of lost Olmsted green space and the planting of new avenue trees.
- The signalized intersection is similar to the original Olmsted design for this location.
- The signalized intersection provides a more visible and recognizable gateway for Franklin Park.
- The signalized intersection provides better pedestrian and bicycle access because the crossings are signal-protected. This is especially important because this is a major connection between public transportation at Forest Hills and the Franklin Park, as well as the Shattuck Hospital.

## 6.0 Arborway Master Plan Recommendations

The recommendations included in this chapter address historic landscape, pedestrian, bicycle, and motor vehicle improvements for the Arborway that best satisfy the Master Plan goals and objectives. These recommendations were selected based on the evaluation of alternatives discussed in Chapter 5, as well as an overall preservation approach focused on retaining and perpetuating the Arborway's historic parkway character. These recommendations incorporate many of the options explored during the course of developing the Master Plan and respond to comments raised by community members and agency representatives.

The Master Plan recommendations include the Preferred Alternative, which is a long-term conceptual plan for the Arborway corridor; recommendations for short-term improvements to the corridor that can be implemented without major roadway changes, and a discussion of outstanding issues that the Arborway Master Plan has raised, but is not able to fully address. This section of the report summarizes these recommendations, as well as preliminary order-of-magnitude cost estimates for the Preferred Alternative and the short-term recommendations.

### 6.1 Treatment Philosophy and Approach

The Arborway was developed as part of a system of parkways that connected a series of public parks and the Arnold Arboretum to form one of the premier park systems in the United States. Like other early public parkways designed originally for carriages rather than automobiles, the Arborway has over time made the transition from pleasure driving to commuter use. With a cultural landscape such as the Arborway, it is important to document the landscape's history before making recommendations for physical change, in order to fully understand which features, materials and spaces contribute to its historic significance, and thus ensure they are not inadvertently lost or damaged.

For the Arborway, the challenge is to preserve, and perhaps replace character-defining features from the past, while simultaneously adapting the parkway for present day use. In addition, the potential impacts on the adjacent residential communities and the public spaces need to be considered in the recommended treatment. Preservation, Rehabilitation, Restoration, and Reconstruction are the four treatments defined by the National Park Service (NPS) in The Secretary of the Interior's Standards for the Treatment of Historic Properties, 1992. The complete definitions for the four treatments, as defined in the Secretary's Standards, are as follows:

- Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity and materials of a historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.
- Rehabilitation is defined as the act or process of making possible a compatible use for a property through repair, alterations and additions while preserving those portions or features which convey its historical, cultural or architectural values.
- Restoration is defined as the act or process of accurately depicting the form, features and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate with a restoration project.
- Reconstruction is defined as the act or process of depicting, by means of new construction, the form, features and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

### 6.1.1 Selection of the Primary Treatment

As described in Chapter 1, the overall goal of this Master Plan is to preserve and enhance the Arborway's historic character, reinforcing its proximity and connections to major open spaces and surrounding neighborhoods, while at the same time maintaining its function as a safe and convenient multi-modal transportation corridor. This requires a difficult balance between landscape preservation and traffic engineering. To this end, each of the four treatments described above could help to achieve the Master Plan's goals and objectives, but the approaches, benefits, and impacts would differ:

**Preservation** as a treatment would imply minimal efforts needed to retain and repair existing features of the parkway, without wholesale improvements to the character or driving experience. While this would be the easiest and least expensive approach, preservation would retain the non-contributing features, without re-establishing the three circulation ways that are an integral design component. Preservation also implies that as historic features deteriorate, they are repaired or replaced in kind, when needed, so a program of tree replacement along the parkway would be required.

**Rehabilitation** is perhaps the most flexible treatment, because it provides a framework for changing use and the addition of new features, while simultaneously preserving historic character. In the case of the Arborway, rehabilitation is the natural choice, because it allows for the continued automobile use and provides parameters for the addition of new features. Rehabilitation also allows limited replacement of missing features, so that improvements could be made to the Arborway that both enhance the parkway's historic character and simultaneously address the complex traffic and vehicular issues. Rehabilitation would allow for the removal or redesign of existing non-contributing features, such as the Casey Overpass.

**Restoration** is not a frequently used treatment for a number of reasons. Because the goal of restoration is to recreate the appearance of a property at a specific point in time, a high level of documentation is required to eliminate speculation. Restoration of the Arborway to the end of the Secondary Period of Significance (1949) would result in the complete removal of the Casey Overpass, but would retain Kelley and Murray Circles. Restoration to the Primary Period (1897) would necessitate a complete change in use, surface material, and character. While this may be advantageous from a completely historic landscape perspective, the impacts to vehicular circulation would be too great to tolerate.

**Reconstruction** is largely an unused treatment because it results in the re-building of lost historic properties. Since the Arborway remains, though altered, this solution is not applicable.

Based on this evaluation, the primary treatment for the Arborway is rehabilitation, which provides a framework for sound stewardship of the parkway landscape. The recommendations that follow meet the Secretary's Standards, re-establish the three circulation systems, enhance the Arborway's historic character and address traffic safety and volume.

### 6.1.2 Rehabilitation Standards

The following Rehabilitation Standards from the Secretary of the Interior's Standards for the Treatment of Historic Properties are the principals that the Master Plan Recommendations will follow:

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.
2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.
4. Changes to a property that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible materials. Replacement of missing features will be substantiated by documentary and physical evidence.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.
9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, or spatial relationships that characterize the property. The new work will be differentiated from the old and will be compatible with the historic materials, features, size, scale, and proportion, and massing to protect the integrity of the property and its environment.
10. New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

## 6.2 Long-Term Preferred Alternative

The Preferred Alternative is the combination of long-term improvements to the Arborway that provides the best balance among the historic landscape, pedestrian and bicycle, and motor vehicle traffic priorities. The Preferred Alternative does not represent the unanimous choice of all study participants. Instead, it is the combination of improvements that the Rizzo Team, with the consultation of the Boston Parks and Recreation Department and the Arborway Master Plan Working Group, has identified as best satisfying the goals, objectives, and constraints of the Arborway Master Plan. Even with the selection of the Preferred Alternative, the final report identifies a number of outstanding issues, including changes to vehicular access to and from local neighborhood streets.

The Preferred Alternative in each segment of the corridor is based on the most desirable design alternative evaluated in Section 5. However, the Preferred Alternative also refines these alternatives in order to produce the best possible plan. The Preferred Alternative incorporates advantageous elements of other alternatives, as well as changes that respond to comments and issues raised by community members and agency representatives. Figure 6-1 shows the Preferred Alternative.

The following is a summary of the Preferred Alternative, and its key characteristics with respect to the historic landscape, pedestrian and bicycle access, and motor vehicle traffic.

### Historic Landscape

- Extant historic landscape is preserved.
- Paved area is reduced and green space is expanded at various points throughout the Arborway corridor.
- New avenue trees are planted to restore characteristic rows of trees, and trees that are dead or dying are replaced.

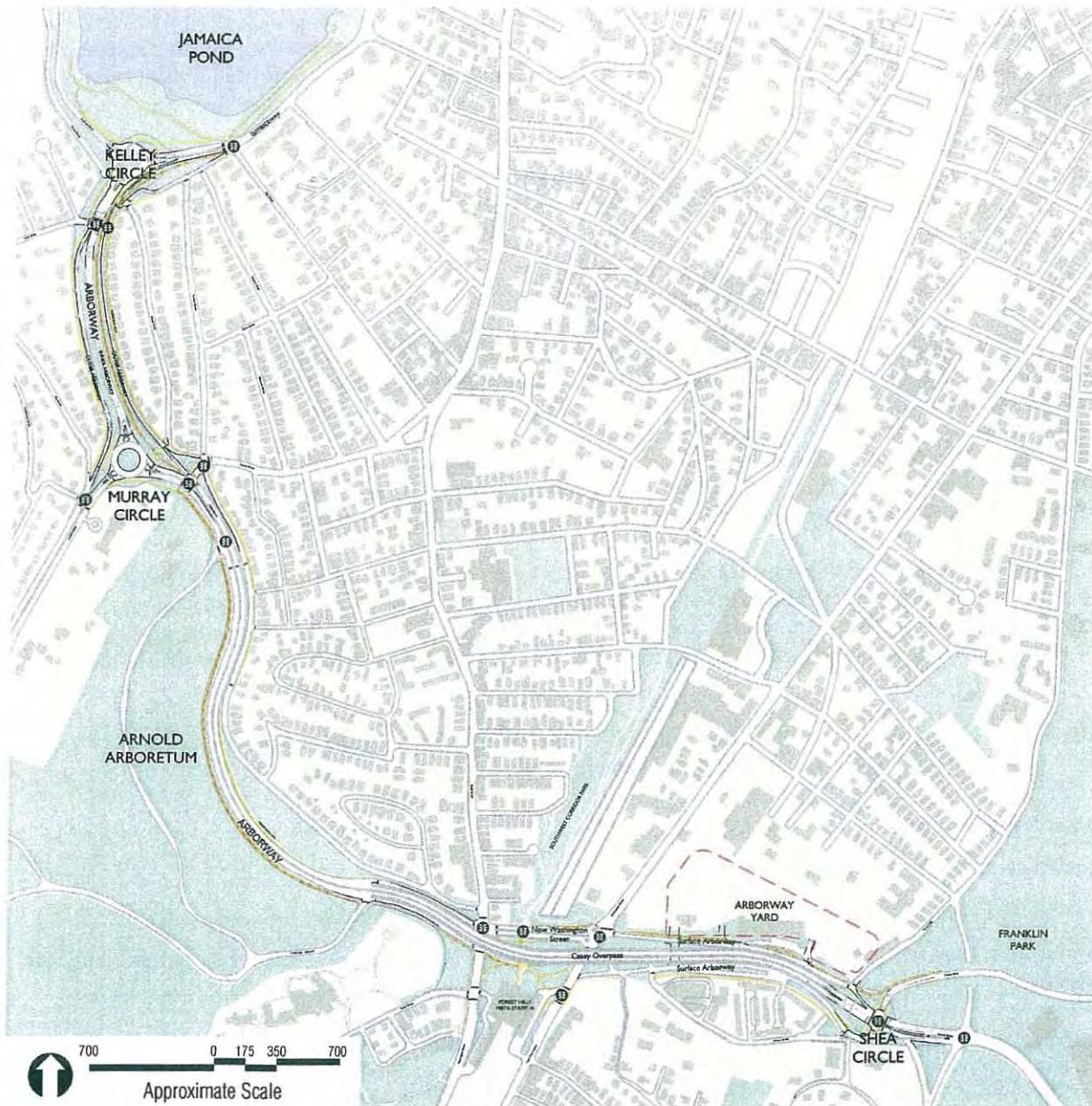
### Pedestrian and Bicycle

- A continuous, well-marked shared-use bicycle and pedestrian path is provided along the Arborway, with connections between Jamaica Pond, the Arnold Arboretum, Forest Hills, the Southwest Corridor Park, and Franklin Park. The shared-use path is a 12-foot wide paved path.
- All major roadway crossings on the shared-use path are protected by traffic signals.

- New sidewalks are created throughout the Arborway corridor to enhance connectivity and improve access.

### **Motor Vehicle**

- Modern roundabouts replace large, irregular rotaries at Kelley Circle and Murray Circle.
- The Outer Arborway roadways are reduced from two lanes to one lane in each direction.
- The Arborway northbound and southbound roadways are consolidated and controlled by traffic signals at Pond Street and Centre Street.
- The large rotary at Shea Circle is replaced with a signalized intersection that provides an improved gateway to Franklin Park, and signal-protected crossings to Franklin Park.



**Figure 6-1 Preferred Alternative**

## 6.2.1 Landscape Treatment Recommendations

### Spatial organization, land use, and cultural traditions

As defined by this report, the parkway concept entails a linear roadway with regularly spaced parallel rows of trees. The Preferred Alternative preserves and perpetuates this vision for the Arborway, although the plan does recommend modifications to the parkway alignment and the design of the three rotaries. The landscape will remain a scenic parkway connecting Jamaica Pond, Franklin Park and the Arnold Arboretum within the Emerald Necklace park system. The landscape Treatment Plan provides recommendations for the extant landscape and for modifications to the roadway that help to achieve the Master Plan goals.

### Circulation

The circulation system is the primary character-defining feature of the Arborway, with the key historic feature being the three separate ways - footpath, carriage path or the street, and the “ride” or bridle path. One of the major proposals of this report is to bring back “the ride” as a multi-use path to accommodate bicycles and pedestrians. Other recommendations related to the treatment of the circulation system include:

- The main park entrance at the Arnold Arboretum retains integrity and should be preserved.
- The entrance to Franklin Park should be rehabilitated so that it provides access for both pedestrians and bicycles.
- Paving surfaces proposed for the Treatment Plan should respect the palette that has been selected and installed in other areas of the Emerald Necklace park system. Elsewhere in the Emerald Necklace, city sidewalks are concrete, pedestrian paths are bituminous with rolled stone cover, bicycle ways are bituminous concrete, roads are bituminous concrete, and curbs are granite.

### Topography

The Treatment Plan recommends that the character of the topography be preserved.

### Views and Vistas

The Treatment Plan proposes maintaining and enhancing the selective designed vistas of the Olmsted Period, which include a vista of Jamaica Pond at the junction of the Jamaicaway and the Arborway at Parkman Drive, the Franklin Park entrance at Forest Hills Street now Shea Circle, and the main entrance of the Arnold Arboretum at Centre Street / Murray Circle.

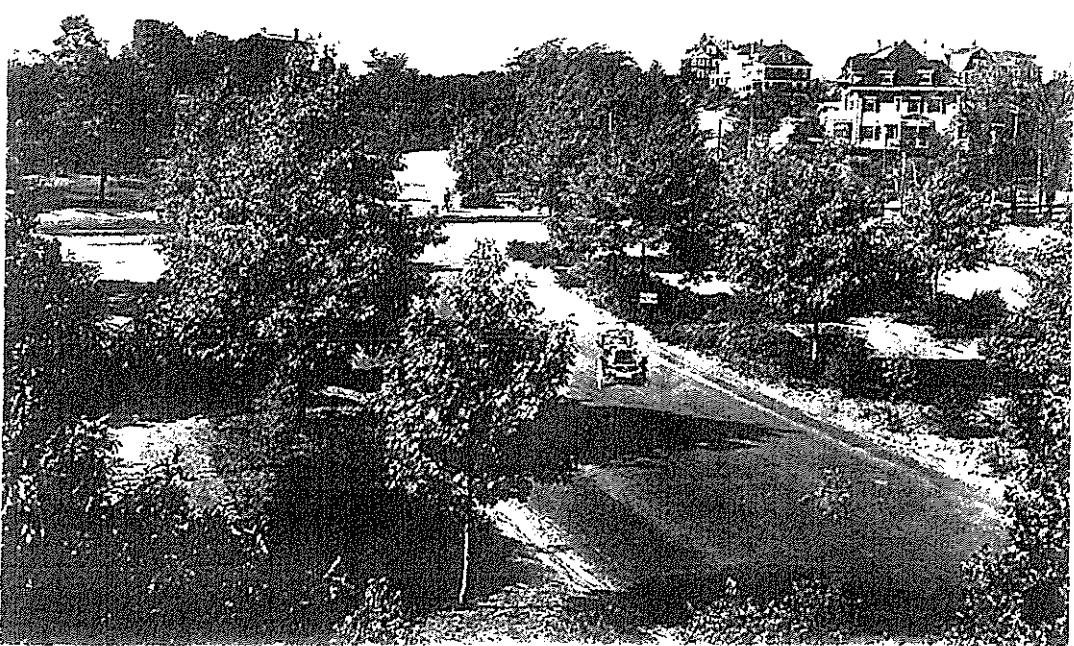
### Vegetation

Planting plans have not been found for the Primary Period of Significance. Therefore, the Treatment Plan proposes new planting based primarily on the illustrative historic plans and historic photographs. The recommended plantings are consistent with the recommendations for pedestrian and bicycle access, and the recommendations for motor vehicle traffic.

The parallel rows of parkway trees are a significant character-defining feature. As originally designed, they were not only a regularly spaced high canopy parallel, but they also acted to define the separate ways for the footpath, carriage path or the street, and the “ride” or bridle path. As finally planted in 1898, they were planted as a monoculture of *Quercus rubrum*, Red Oak. Specific treatment recommendations for vegetation along the Arborway are listed below separately for trees and shrubs.

### **1. Tree Plantings**

- Where possible street trees should be located where they were located historically.
- Where the recommended traffic modifications preclude planting according to historic location, street trees should be planted in character with the historic planting, lining both sides of the Arborway, as shown in Figures 6-2 and 6-3.



**Figure 6-2    Historic View of the Arborway Looking West from Forest Hill, Showing Regular Spacing of Red Oaks and Underplanting of Shrubs, SPNEA.**



**Figure 6-3 1916 View of the Arborway at Jamaica Pond by H. Perkins, FLONS #920-75.**

- Based on the historic photographs and plans, the Treatment Plan proposes groupings of trees in some locations adjacent to the Arborway.
- Trees of inappropriate species are to remain except when in conflict with the street tree planting.
- Heritage trees will be preserved and shall only be removed if they are in dead or in poor condition and pose a health safety issue.
- All trees to remain should be pruned.
- All tree planting along the Arborway should have the missing individuals replaced to maintain a consistent line of regularly spaced trees. Parkway trees are composed of a single species or monoculture of Red Oak (1898) along any given edge and the use of the same single species should continue. In the Southwest Corridor area, however, Ginkgo were introduced in the 1980s. These trees are generally healthy so they should be maintained, with missing individual Gingko trees replaced in this area only.
- All new trees should be a minimum of four (4") inches in caliper, but preferably six (6") inches in caliper. Root balls should be 25% larger than the American Association of Nurserymen standard and should not be guyed or staked in place since vandalism of lower branches usually results. The tree should be mulched and protected from the lawn mower.
- After planting it is critical that all plantings be placed on a regular fertilizing and watering program for the first two years after planting. The two-year maintenance requirement should be part of any new capital projects or general tree planting programs. The larger size root ball and the 2-year maintenance will insure the success of the planting. During the summer months, trees should be watered at least weekly, especially during drought. A pruning program should also be established.

The overall tree planting changes for the Arborway are summarized in Table 6-1. The following tables compare the existing tree counts and proposed tree counts at the completion of the Treatment Plan. The

total number of existing trees preserved is 444 and the total number of new trees to be planted under the Treatment Plan is 256 for a grand total of 700 trees.

**Table 6-1 Arborway Corridor Tree Count Summary**

		Existing Trees	Removals	New Tree Plantings	Net Gain or Loss
Heritage shade trees	Good or fair condition	123	13		
	Poor condition or dead	24	24		
Non-heritage shade trees	Good or fair condition	370	99		
	Poor condition or dead	54	48		
<b>TOTAL Shade Trees</b>		<b>571</b>	<b>184</b>	<b>257</b>	<b>+73</b>
Evergreen / Ornamental trees	Good or fair condition	122	13		
	Poor condition or dead	15	3		
<b>TOTAL Evergreen / Ornamental Trees</b>		<b>137</b>	<b>16</b>	<b>0</b>	<b>-15</b>

The specific tree removal and planting plans are shown for each segment of the Arborway below in Section 6.2.3.

## 2. Shrub Plantings

- The historic photographs show extensive shrub plantings along the Arborway (Figure 6-2). It is interesting to note, however, that is the 1911 Commissioners Report comments on and describes the shrub plantings and questions the appropriateness of shrubs as follows:

“In the original plans for the Arborway the planting, except where there were widenings of the planting spaces or walls to be covered or other special conditions, was intended to be limited to trees and grass, as in Commonwealth Avenue. The narrow planting strips have been since planted, in general, with continuous shrubbery, without clipped turf. From the point of view of visitors passing through the Arborway in vehicles the effect has been good, on the whole, although the bare cultivated earth in front of and amongst the shrubs is distressing to the eye. This kind of planting has differentiated the Arborway from the more ordinary type of wide parkway, such as Commonwealth Avenue, and has afforded an attractive foreground of varied foliage and periodical bloom. It must be recognized, however, that this treatment, in which there is a strong expression of wildness and rusticity, is of questionable appropriateness where the constructional lines of the parkway are formal to the extent of being parallel horizontally and vertically and where the planting strips are so narrow as is the case from Pond Street to Centre Street, and from South Street to Forest Hills Street, and it will be unquestionably inappropriate when the parkway frontage is fully occupied by apartment houses and residences of a city type. Therefore the policy should be to gradually formalize the style of maintenance of these planting strips as the character of adjoining private improvements becomes more costly and more citified.”<sup>1</sup>

- The proposed treatment plan recommends planting shrubs at the three major intersections, Kelley Circle, Murray Circle, and Shea Circle, and on areas that have been gained adjacent to the parks or the Arboretum.
- As seen in the following historic photographs, shrubs were historically low and located in the traffic islands (Figures 6-2 and 6-3). Proposed shrub planting should respond to traffic sight lines and be low

<sup>1</sup> “Thirty-Sixth Annual Report of the Board of Commissioners of the Department of Parks for the City of Boston, 1911, pp. 70-71.

species in traffic islands, but larger shrubs should be used in areas adjacent to the parks and the Arboretum. All new shrubs should be deciduous to re-establish the character of the historic planting.

- All new plants should be a minimum of 18"-24" in height and shall be densely planted. Root balls should be 25% larger than the American Association of Nurserymen standard and the plants should be mulched and protected with low fencing for two years until they are established.
- It is critical that all plantings be placed on a regular fertilizing and watering program for the first two years after planting. The two-year maintenance requirement should be part of any new capital projects or general tree planting programs. The larger size root ball and the 2-year maintenance will insure the success of the planting.
- Shrubs should be selected from Frederick Law Olmsted's "Emerald Necklace Plant List" (prepared by Boston Parks and Recreation Department from a plant list compiled by Cynthia Zaitzevsky for her book, Frederick Law Olmsted and the Boston Park System).

The specific tree removal and planting plans are shown for each segment of the Arborway below in Section 6.2.3.

### 3. Proposed Plant Materials

Avenue Tree along the Parkway:

- *Quercus rubra* Red Oak

Large Deciduous Trees to match existing Ginkgo:

- *Ginkgo biloba* Ginkgo

Large Shrubs in large areas gained by alternatives:

▪ <i>Aronia arbutifolia</i>	Red Chokeberry
▪ <i>Clethra alnifolia</i>	Summersweet Clethra
▪ <i>Lindera benzoin</i>	Spicebush
▪ <i>Physocarpus opulifolius</i>	Common Ninebark
▪ <i>Spiraea x vanhouttei</i>	Vanhoutte Spirea
▪ <i>Viburnum dentatum</i>	Arrowwood Viburnum
▪ <i>Viburnum opulus</i>	Cranberrybush Viburnum

Small Shrubs in traffic islands:

▪ <i>Clethra alnifolia 'Hummingbird'</i>	Hummingbird Clethra
▪ <i>Comptonia peregrina</i>	Sweet Fern
▪ <i>Potentilla fruticosa</i>	Shrubby Cinquefoil
▪ <i>Genista tinctoria</i>	Dyer's Greenwood
▪ <i>Rhus aromatica 'Gro-low'</i>	Gro-Low Fragrant Sumac
▪ <i>Xanthorhiza simplicissima</i>	Yellowroot

### 4. Lawns:

- Lawns should be rehabilitated to restore worn, disturbed and eroded areas.
- Lawns should be seeded, not sodded. Seed mixes should be appropriate to the sun/shade conditions of the specific areas and should be protected with temporary fencing until established. Seed species selected should be hardy species that can tolerate heavy use and periodic dry conditions.
- After rehabilitation it is critical that the lawns be placed on a regular maintenance program to perpetuate as uniform and finished an appearance as is possible for a public open space. An irrigation system is not recommended.

## **Site Furnishings**

Site furnishings proposed in the Treatment Plan respect the character and materials of similar features selected and installed in other areas of the Emerald Necklace Parks System. New elements that were not included in the historic plans, such as fences and traffic signal mast-arms, should be consistent with the historical character-defining features.

### **I. Fences**

Fences in the medians were not included in the original Olmsted design, but a fence was built in the median separating the Arborway from the Upper Arborway near the Arnold Arboretum. This fence was added in order to prevent mid-block pedestrian crossings in this segment of the Arborway where speeds are high and roadway curves limit sight distance. The existing fence is a tall, unattractive chain-link fence (Figure 6-4), and it should be replaced with a decorative fence that is in keeping with the historic character (Figure 6-5).

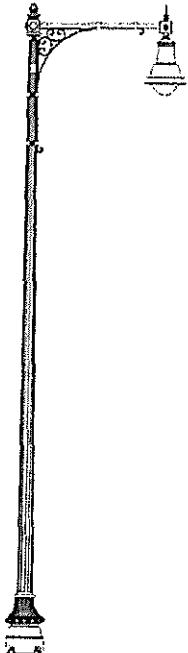


**Figure 6-4 Existing Site Furnishings – Fence in Median Near Arnold Arboretum**



**Figure 6-5 Recommended Site Furnishings – Replacement Fence and Tree Plantings in Median Near Arnold Arboretum**

## 2. Lighting

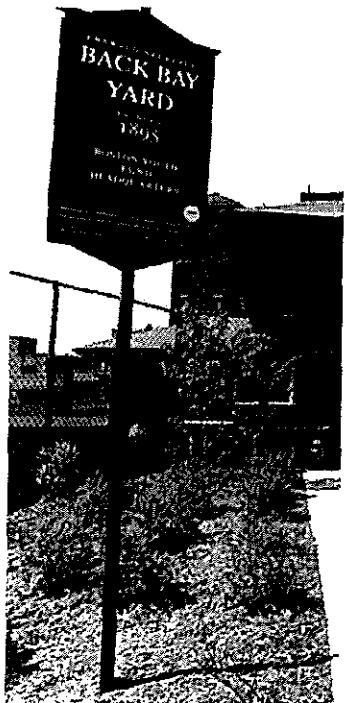


No documentation has been found that dates the existing street lighting, and park reports during the Olmsted Period make no mention of lighting design along the parkways. The Treatment Plan recommends a light standard that is compatible with both the historic character and with the lighting on other parkways in the Emerald Necklace. This is the MDC Historic Pendant Light, which is the MDC's standard for their parkways (Figure 6-6).

**Figure 6-6 Recommended Site Furnishings – Historic Pendant Light**

## 3. Signage

Signage should be compatible with the Arborway's historic character and with other signage used for similar parks, such as other parts of the Emerald Necklace.



**Figure 6-7 Recommended Site Furnishings – Signage**

## 4. Benches and trash receptacles

Benches and trash receptacles will not be placed along the parkway, as they were never part of the original Olmsted plan. Instead, they should be placed at the destination points, such as the Arnold Arboretum, Franklin Park and Jamaica Pond.

## 5. Traffic signal mast-arms

Traffic signals were not included in the original Olmsted design. However, traffic demand and traffic safety necessitate traffic signals along the Arborway. In addition, the Preferred Alternative creates some

signalized intersections with wider approaches than those that currently exist. Such intersections are expected to require traffic signals mounted on mast-arms, rather than mounted only on posts. The new traffic signal mast-arm should be black and compatible with the parkway lighting (Figure 6-8).



**Figure 6-8 Recommended Site Furnishings – Traffic Signal Mast-Arm**

### **6.2.2 Description of Preferred Alternative by Segment of the Arborway**

The following is a more detailed description of the Preferred Alternative for each section of the Arborway. This description includes the landscape treatment plan, the pedestrian and bicycle access, and motor vehicle traffic characteristics of the proposed improvements within each segment of the Arborway.

#### **Kelley Circle to Murray Circle**

As described above, replacing Kelley Circle and Murray Circle with modern roundabouts achieves the best combination of historic landscape preservation and restoration, pedestrian and bicycle access improvement, and motor vehicle operations and safety. Therefore, in this segment of the Arborway, Alternative 1 is the basis for the Preferred Alternative, although the Preferred Alternative also includes refinements designed to address Alternative 1's disadvantages. Figure 6-9 shows the Preferred Alternative for the Kelley Circle to Murray Circle segment.

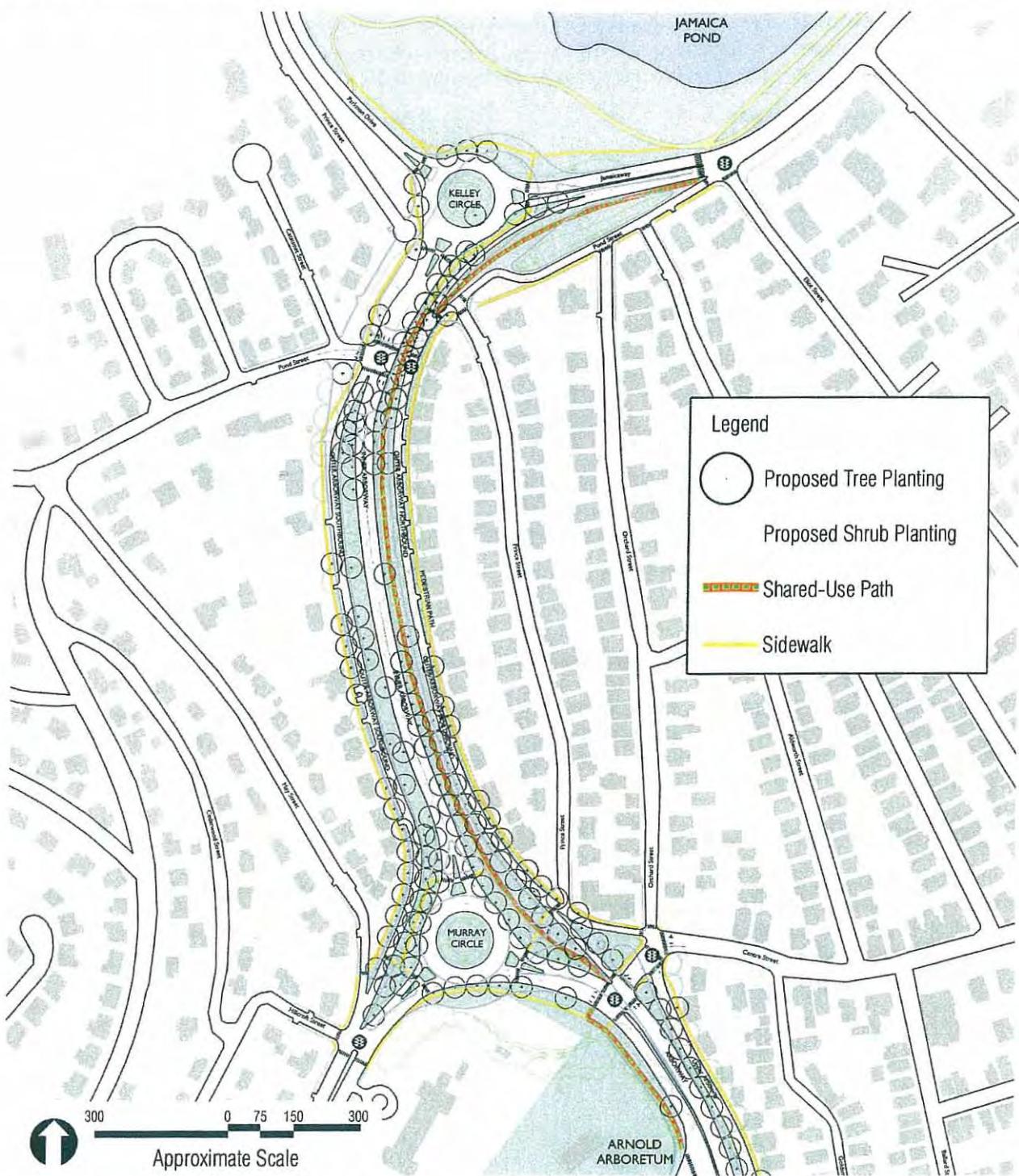
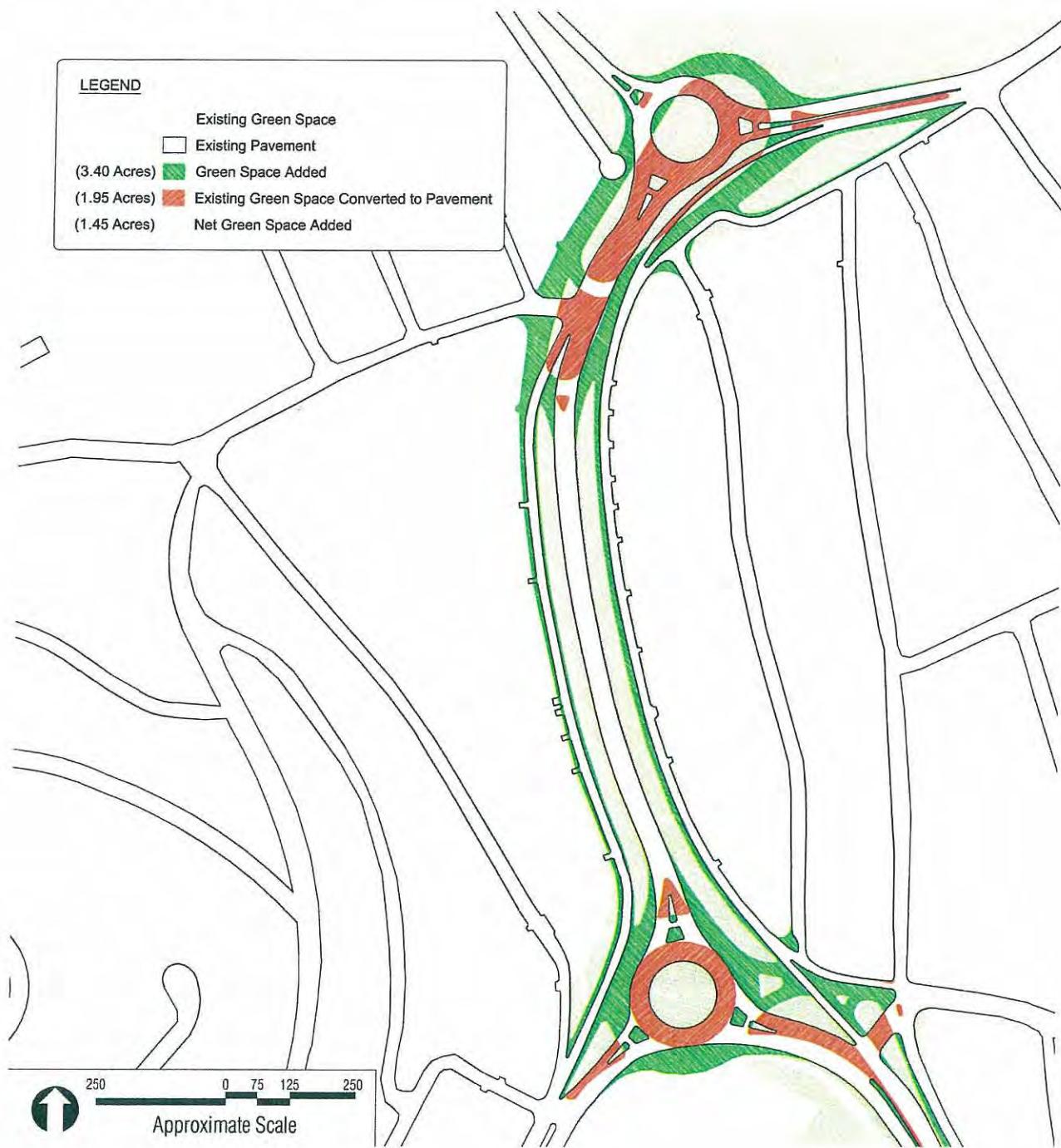


Figure 6-9 Preferred Alternative – Kelley Circle to Murray Circle

### Historic Landscape

- A significant amount of pavement is eliminated and replaced with green space. This includes areas adjacent to Jamaica Pond and near Murray Circle that were green space in the original Olmsted design, but were later

paved to improve traffic operations. Figure 6-10 shows the change in paved area and green space between Kelley Circle and Murray Circle.



**Figure 6-10 Changes to Paved Area and Park Space – Kelley Circle to Murray Circle**

- The enhanced green space creates the opportunity to plant 132 new avenue trees along the edges of the roadways, in keeping with the Olmsted Arborway character, while the Preferred Alternative would remove six heritage trees due to poor health and six heritage trees for roadway re-alignment. The proposed tree removals and plantings are shown in Figure 6-11.

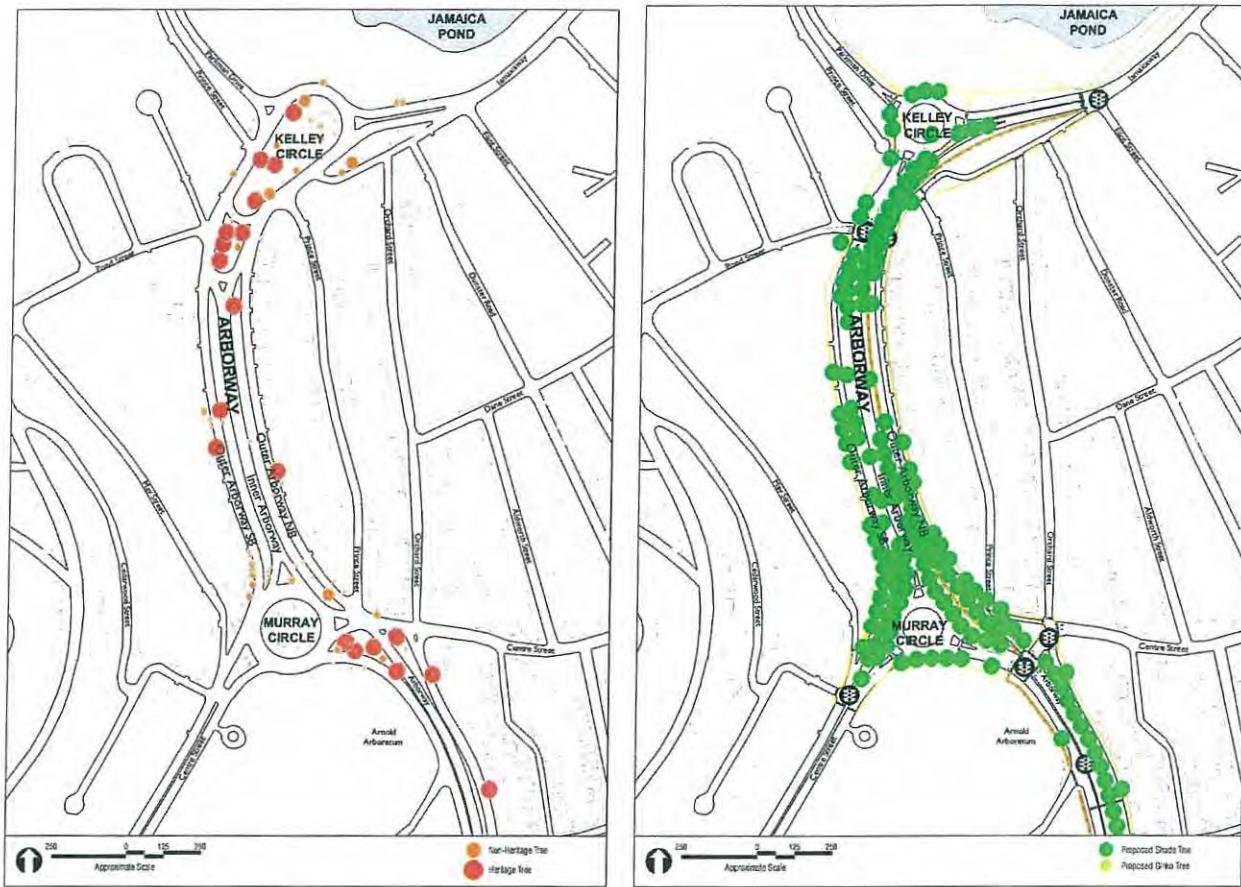
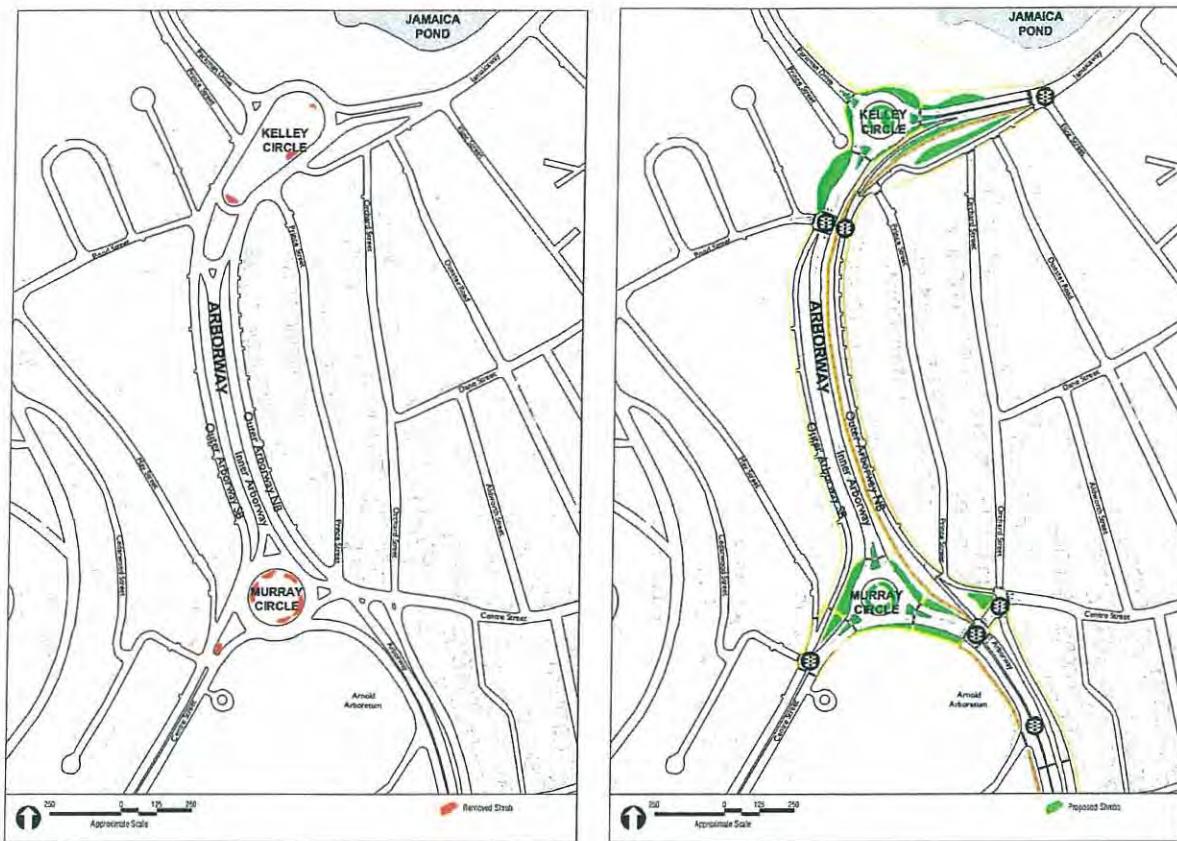


Figure 6-11 Tree Removals (left) and Tree Plantings (right) – Kelley Circle to Murray Circle

Table 6-2 Arborway Tree Count Summary – Kelley Circle to Murray Circle

	Existing Trees	Removals	New Tree Plantings	Net Gain or Loss
Heritage shade trees				
Good or fair condition	60	9		
Poor condition or dead	9	9		
Non-heritage shade trees				
Good or fair condition	126	50		
Poor condition or dead	23	23		
<b>TOTAL Shade Trees</b>	<b>218</b>	<b>91</b>	<b>142</b>	<b>+51</b>
Ornamental/evergreen trees				
Good or fair condition	35	13		
Poor condition or dead	3	3		
<b>TOTAL Evergreen/Ornamental Trees</b>	<b>38</b>	<b>16</b>	<b>0</b>	<b>-16</b>

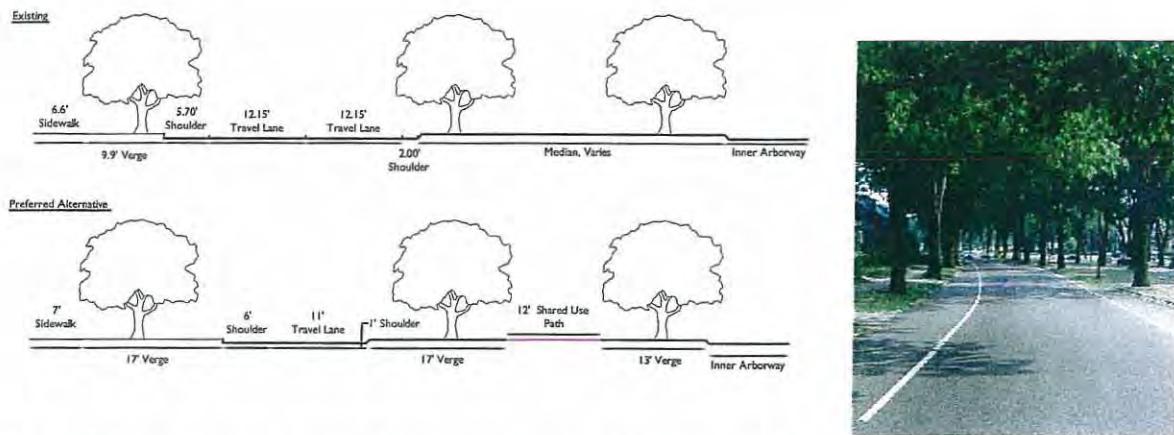
- The Preferred Alternative also eliminates some existing shrub plantings, principally in traffic islands. These plantings are replaced with more extensive shrub plantings, including more plantings that are in green spaces contiguous to existing park spaces, or along the edges of the Arborway, where they are more accessible than if they were in traffic islands. The proposed shrub removals and plantings are shown in Figure 6-12.



**Figure 6-12 Shrub Removals (left) and Shrub Plantings (right) – Kelley Circle to Murray Circle**

### Pedestrian and Bicycle

- The 12-foot wide paved continuous shared-use pedestrian / bicycle path begins at Jamaica Pond, and extends the length of the Arborway. The shared-use path crosses the Jamaicaway at a new signalized crossing at Eliot Street. From here, the shared-use path runs along the eastern median, between the Inner Arborway and Outer Arborway Northbound, with a row of trees on each side of the path. This location has historic value since Olmsted's bridle path, known as "the ride", was originally located in the eastern median. The cross-section of the Outer Arborway Northbound and the eastern median are shown in Figure 6-13.



**Figure 6-13 Cross-Section Showing Shared-Use Path – Outer Arborway near Kelley Circle, Facing South**

- The continuous shared-use path continues along the eastern median to Centre Street, where it crosses the Arborway at a signal-protected crossing to the western side of the parkway adjacent to the Arnold Arboretum.
- Pedestrian and bicycle roadways crossings are improved, through signal protection, shorter crossings, and lower vehicle design speeds. This includes a new signal at Eliot Street and a consolidated crossing at Pond Street. These changes would improve the crossings between the Pondside neighborhood and Jamaica Pond.
- Signage would be developed to guide pedestrians and bicyclists along the route from Jamaica Pond to Franklin Park. The signs would direct pedestrians and bicyclists along the Arborway, provide continuity, and list destinations with directional arrows. Examples of proposed pedestrian and bicycle guide signs are shown in Figure 6-14 for the area around Kelley Circle.

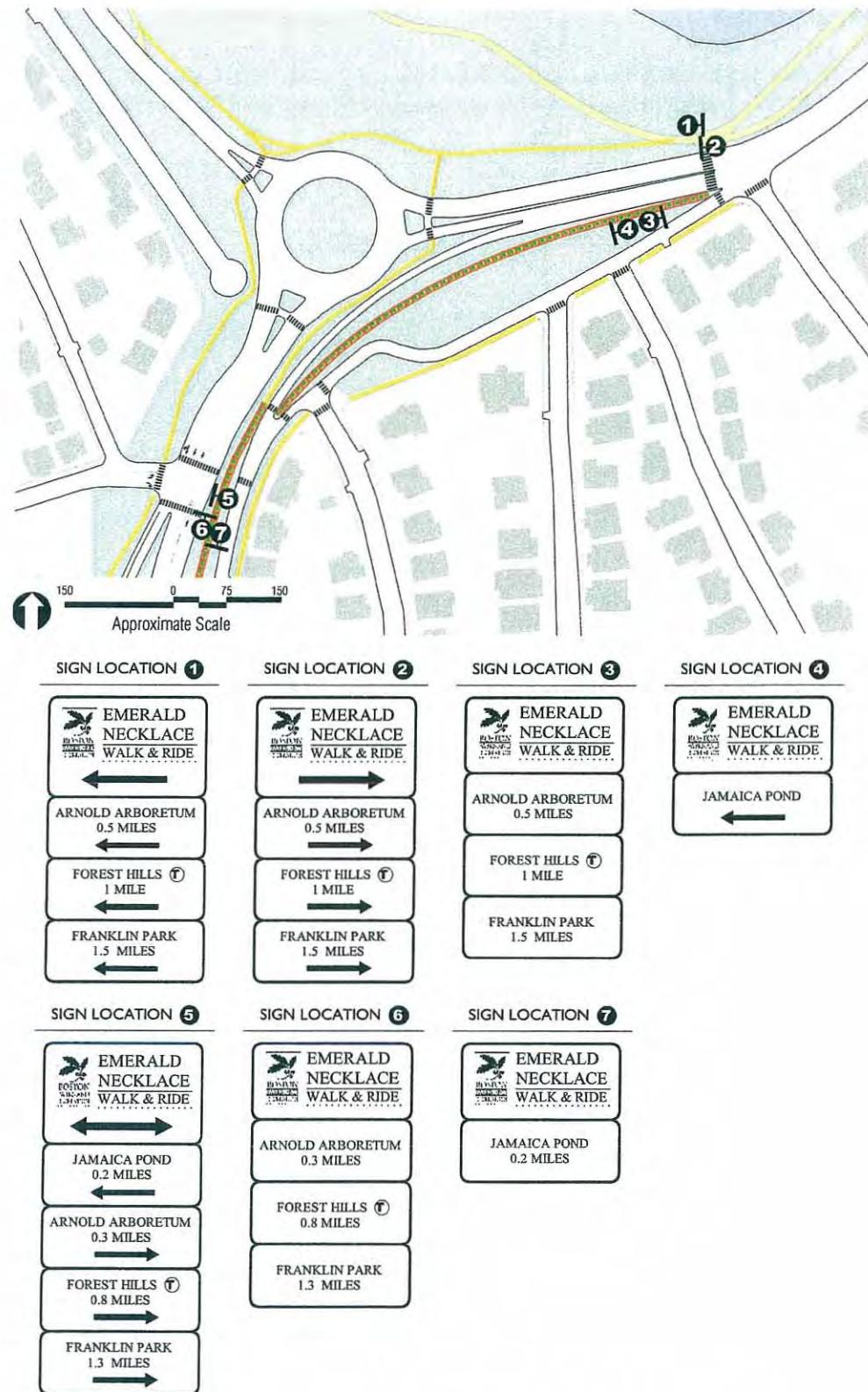


Figure 6-14 Typical Pedestrian and Bicycle Way-Finding Signage

## Motor Vehicle Traffic

The following is a summary of the Preferred Alternative's changes to roadway design, traffic circulation, and traffic operations that facilitate the improvements to the historic landscape and pedestrian / bicycle access.

### Kelley Circle

The Kelley Circle section of the Preferred Alternative is shown in Figure 6-15.

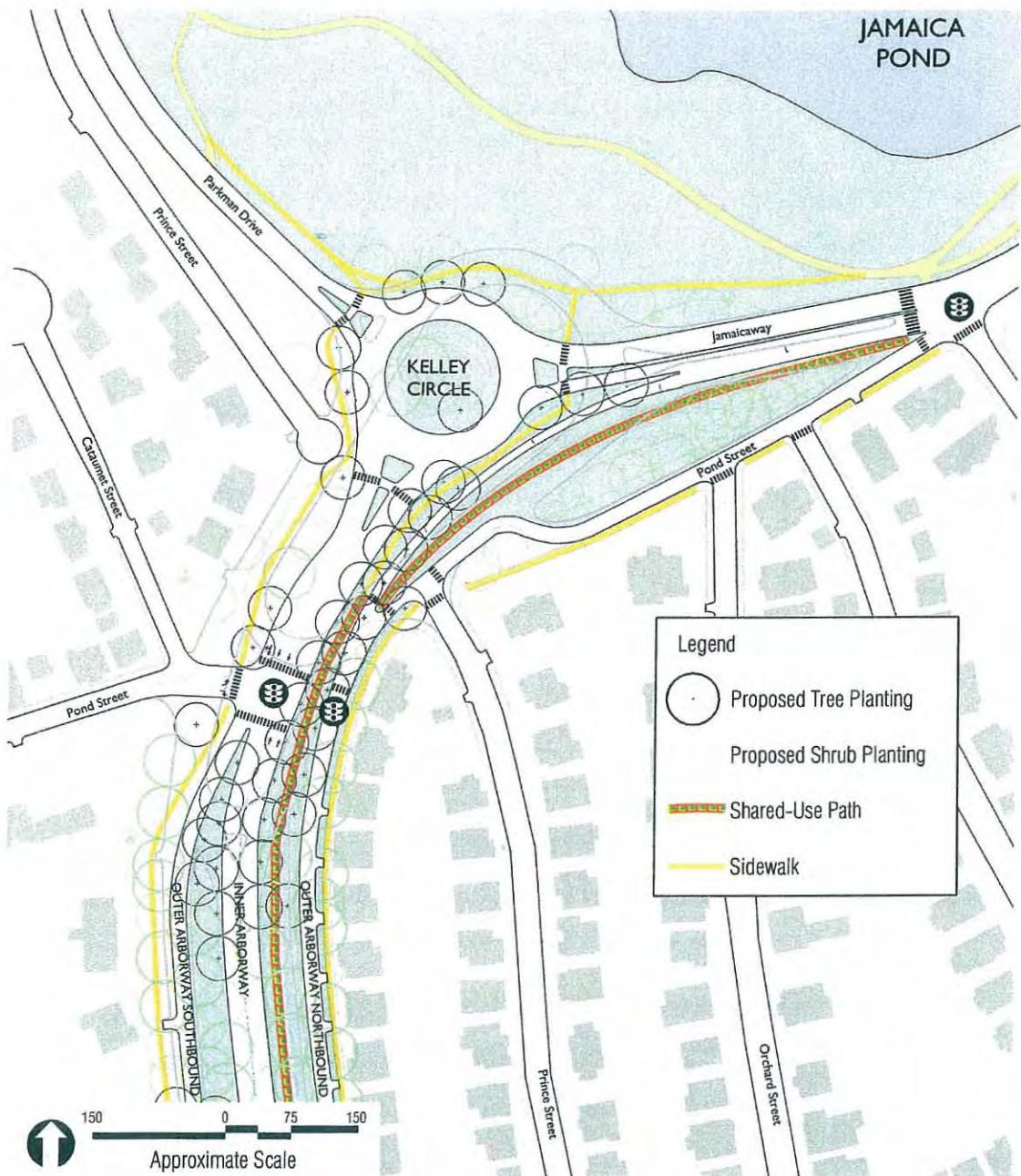


Figure 6-15 Preferred Alternative – Kelley Circle

The Preferred Alternative entails the following major roadway and traffic changes in the vicinity of Kelley Circle.

- The existing large, oblong rotary at Kelley Circle is replaced with a smaller “modern roundabout.”
- A new traffic signal is implemented at the intersection of Jamaicaway / Eliot Street.
- The existing signalized intersection at Pond Street / Kelley Circle is reconfigured to control both northbound and southbound Arborway traffic.
- The Outer Arborway Northbound is reconfigured so that it does not provide access to Kelley Circle, but only to Jamaicaway northbound or to the Pondside neighborhood via Pond Street (the segment between Prince Street and Eliot Street).

The traffic operations in the Kelley Circle area are summarized below in Table 6-3.

**Table 6-3 Preferred Alternative Traffic Operations Summary – Kelley Circle**

Location	Peak Hour	2002 Existing Conditions		2012 No-Build Conditions	Preferred Alternative 2012 Build Conditions
		Level of Service	Level of Service	Level of Service	Level of Service
<b>Jamaicaway / Eliot Street</b>	AM	-	-	-	B
	PM	-	-	-	A
<b>Kelley Circle</b>					
Jamaicaway SB Approach	AM	D	-	E	E
	PM	A	-	A	B
Parkman Drive EB Approach	AM	B	-	C	C
	PM	F	-	F	F
Arborway NB Approach	AM	-	-	-	A
	PM	-	-	-	A
<b>Arborway / Pond Street</b>	AM	D	-	D	C
	PM	E	-	F	F
<b>Pedestrian Signal: Arborway Northbound at Pond Street</b>	AM	B	-	B	A
	PM	A	-	A	A

The following is a description of traffic movements and traffic operations at each of the intersections in the redesigned Kelley Circle area.

### **Jamaicaway / Eliot Street**

In the Preferred Alternative, a traffic signal is installed at the intersection of Jamaicaway / Eliot Street. The principal purpose of the traffic signal at this location is to create a signal-protected crossing at Eliot Street, which is an important pedestrian and bicycle destination for access to Jamaica Pond.

### **Kelley Circle**

In its existing configuration, Kelley Circle is a large oblong rotary with traffic signal control at its southern end. The Preferred Alternative entails replacing the existing rotary with a compact “modern roundabout” that is separated from the redesigned signalized intersection at Pond Street by approximately 300 feet. The proposed Kelley Circle modern roundabout is a two-lane roundabout with three approaches: a two-lane Arborway northbound approach, a two-lane Jamaicaway southbound approach, and a one-lane Parkman Drive southbound approach. The Preferred Alternative proposes that the low-volume segment of Prince Street parallel to Parkman Drive be terminated at a dead-end.

Traffic operations at Kelley Circle are generally good in the Preferred Alternative. The Jamaicaway southbound approach operates at LOS E with significant congestion during the AM peak hour, due to the heavy Jamaicaway

northbound to Parkman Drive movement. During the PM peak hour, the Parkman Drive approach is expected to operate at LOS F, with high levels of congestion because it must yield to the heavy Jamaicaway southbound traffic in order to enter the roundabout. As Table 6-2 shows, the situation in the Preferred Alternative is comparable to the future no-build condition.

### **Arborway / Pond Street**

There is currently a traffic signal at Pond Street / Arborway that controls Pond Street and Arborway southbound traffic. This signal does not control Arborway northbound traffic because the large Kelley Circle rotary separates the Arborway southbound from the Arborway northbound at this location. The Preferred Alternative would consolidate the Arborway southbound and northbound, and the signal at Pond Street would control both traffic flows.

The Preferred Alternative does not significantly change the traffic operations or the level of congestion from the existing condition or the future no-build condition. This is because the Arborway northbound traffic flows at the same time that the Arborway southbound traffic flows: the Preferred Alternative does not require the addition of a new vehicle phase. In order to enable this signal phasing approach, Arborway northbound left turns onto Pond Street are prohibited, and these turns must traverse Kelley Circle and make a southbound right turn. This is comparable to the existing condition. As in the current condition, the Preferred Alternative would provide a pushbutton-actuated exclusive pedestrian phase.

### **Pedestrian Signal: Arborway Northbound at Pond Street**

In existing conditions, there is a traffic signal approximately 100 feet north of the northbound Inner Arborway / Outer Arborway Northbound merge. This signal, located in the vicinity of Pond Street, provides a signal-protected pedestrian crossing of the northbound Arborway traffic, and enables a continuous signal-protected crossing of the entire Arborway.

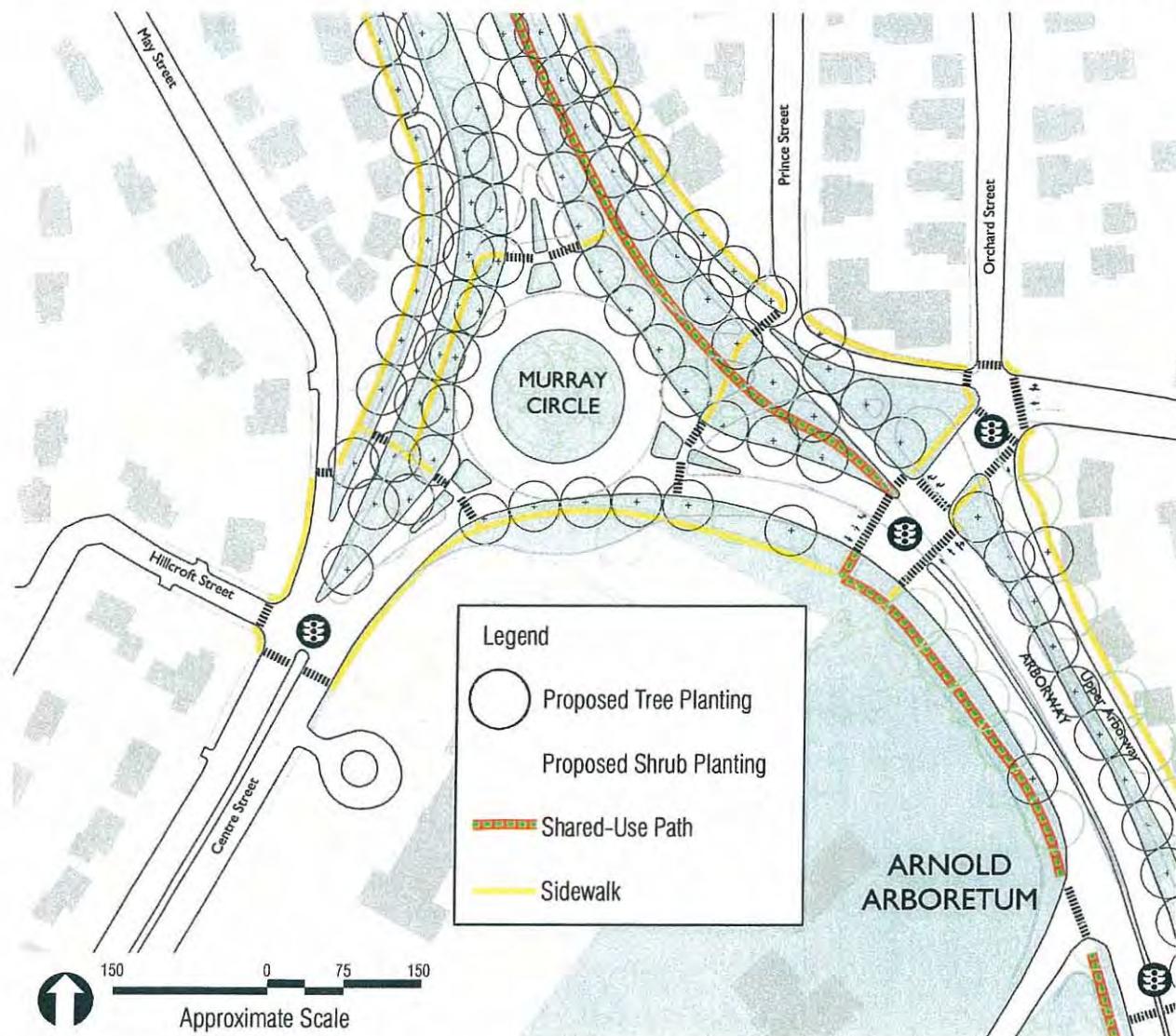
The Preferred Alternative retains a signalized crossing of northbound Arborway traffic in the vicinity of Pond Street that enables a signal-protected crossing of the entire Arborway. However, the proposed roadway redesign changes the configuration of this signal. In the Preferred Alternative, the pedestrian signal controls only the single lane Outer Arborway Northbound.

### **Kelley Circle to Murray Circle**

Between Kelley Circle and Murray Circle, the historic alignment of the Inner Arborway is retained in its current layout. Both the Outer Arborway Southbound and the Outer Arborway Northbound are altered slightly, to reduce them from two travel lanes with a shoulder to one travel lane with a shoulder. The additional width is split between the adjacent median and the outside of the roadway, adjacent to the homes on each Outer Arborway roadway.

### **Murray Circle**

The Preferred Alternative proposes several significant roadway and traffic flow changes in the Murray Circle area. As a Kelley Circle, these changes arise principally from a reduction in paved area that is designed to enhance the historic landscape, improve pedestrian and bicycle accommodation, and better organize traffic flows. These changes are shown in Figure 6-16.



**Figure 6-16 Preferred Alternative – Murray Circle**

The following are the principal changes that the Preferred Alternative proposes at Murray Circle and the adjacent intersections.

- The existing large rotary at Murray Circle is replaced with a smaller “modern roundabout.”
- The Outer Arborway Southbound is reconfigured so that it does not provide access to Murray Circle, but only to Centre Street westbound toward Roslindale and West Roxbury.
- The pedestrian signal at Centre Street / Hillcroft Street, immediately west of Murray Circle, is retained.
- The existing signalized intersection at northbound Arborway / Centre Street is reconfigured to provide more space between the intersection and the nearby Murray Circle roundabout, and to control both northbound and southbound Arborway traffic.
- The intersection of Centre Street / Upper Arborway / Orchard Street is signalized. This intersection is only about 100 feet away from the new Arborway / Centre Street intersection, and it is necessary to signalize the intersection and coordinate it with the Arborway / Centre Street signal in order to provide safe operations.

The traffic operations in the Murray Circle area are summarized below in Table 6-4.

**Table 6-4 Preferred Alternative Traffic Operations Summary – Murray Circle**

Location	Peak Hour	2002 Existing Conditions		2012 No-Build Conditions	Preferred Alternative 2012 Build Conditions
		Level of Service	Level of Service	Level of Service	Level of Service
<b>Murray Circle</b>					
Inner Arborway SB Approach	AM	A		A	B
	PM	B		B	F
Outer Arborway SB Approach	AM	B		C	-
	PM	F		F	-
Centre Street EB Approach	AM	E		F	F
	PM	C		C	F
Centre Street WB Approach	AM	B		B	-
	PM	A		A	-
Arborway NB Approach	AM	-		-	E
	PM	-		-	B
<b>Pedestrian Crossing: Centre Street at Hillcroft Road</b>	AM	C		C	C
	PM	B		B	B
<b>Arborway / Centre Street</b>	AM	E		E	D
	PM	B		C	B
<b>Centre Street / Upper Arborway / Orchard St.</b>					
Upper Arborway NB	AM	F		F	C
	PM	C		D	B
Orchard Street SB	AM	B		B	
	PM	B		B	
<b>Pedestrian Crossing: Arborway at Arboretum</b>	AM	A		A	A
	PM	A		A	A

### **Murray Circle**

Murray Circle is currently a large rotary with high vehicle volumes and high speeds. It also has some unconventional elements that create operational problems. One major issue with the Murray Circle rotary are that two high-volume approaches, southbound Inner Arborway and Outer Arborway Southbound, enter Murray Circle immediately adjacent to each other. The resulting conflicts among these four lanes of heavy traffic create conflicts and problems. Another major issue is that the signalized intersection of northbound Arborway / Centre Street is only about 75 feet away from the Murray Circle rotary.

The Preferred Alternative entails replacing the existing rotary with a compact “modern roundabout,” and reconfiguring the roadway layout to create a more standard roundabout design. The proposed modern roundabout is a two-lane roundabout with three approaches: a two-lane Arborway northbound approach, a two-lane Inner Arborway southbound approach, and a two-lane Centre Street eastbound approach (from Roslindale and West Roxbury). These approaches are arranged regularly around the outside of the roundabout, providing the maximum sight distance for entering vehicles.

The Outer Arborway Southbound is reduced to a single lane with access only to Centre Street westbound toward Roslindale and West Roxbury. The Outer Arborway Southbound no longer provides access to Murray Circle, which improves both safety and traffic operations. To the south of Murray Circle, the Arborway mainline is consolidated, so that the northbound approach lanes and the southbound receiving lanes are on the same leg of the roundabout. As Table 6-3 shows, traffic operations at some of the Murray Circle approaches are worse in the Preferred Alternative. However, some traffic is diverted from Murray Circle, which improves its operations.

### **Pedestrian Crossing of Centre Street at Hillcroft Road**

The Preferred Alternative retains the existing signal that enables pedestrians to cross Centre Street at Hillcroft Road, approximately 200 feet southwest of the new Murray Circle roundabout. This signal can continue to function much as it currently does. The Preferred Alternative would change conditions somewhat at this location. In existing conditions, the westbound approach consists of two receiving lanes from Murray Circle. In the Preferred Alternative, the westbound approach consists of one lane from Outer Arborway Southbound, and one receiving lane from Murray Circle. This change is not expected to have a major effect on traffic operations at this location, since traffic volumes from the two approaches (from Outer Arborway Southbound and from Murray Circle) are relatively even, and the through-traffic has a green signal for the large majority of the signal phase.

### **Arborway / Centre Street**

This intersection is currently located directly east of Murray Circle. The Preferred Alternative relocates and reconfigures the Arborway / Centre Street intersection. The intersection is relocated to the south, and the northbound and southbound Arborway are consolidated and controlled by this signal. This has several benefits:

- The traffic signal is further from Murray Circle: it is approximately 250 feet away from Murray Circle in the Preferred Alternative, instead of approximately 75 feet in the existing condition.
- Because the signal controls both northbound and southbound Arborway, pedestrians and bicycles are provided with a signal-protected crossing of the entire Arborway, rather than only half in the existing condition.
- By consolidating the northbound and southbound Arborway, the Preferred Alternative facilitates creating a more regular, standard roundabout design at Murray Circle.

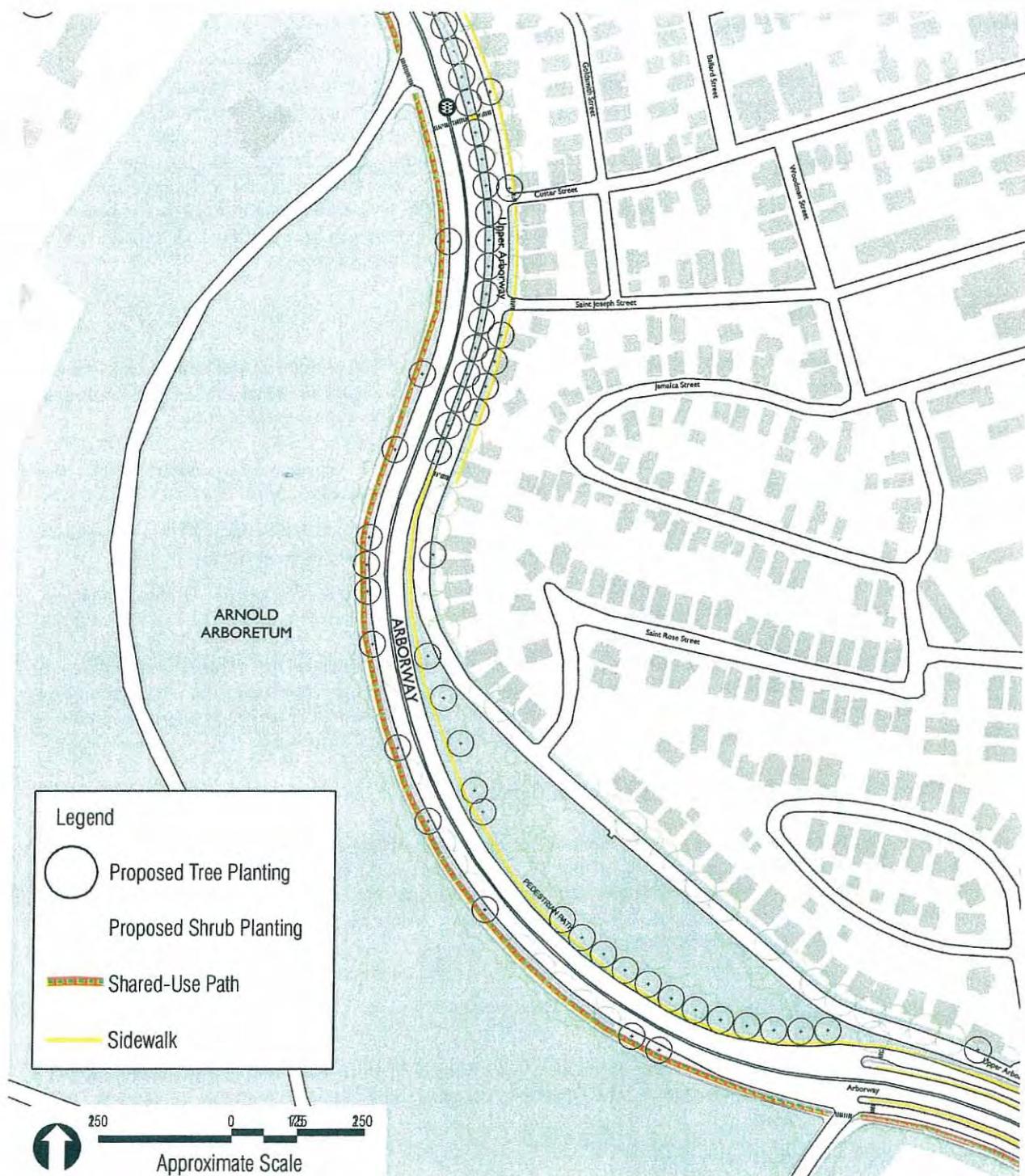
As Table 6-3 shows, the intersection of Arborway / Centre Street operates better in the Preferred Alternative than during the future no-build condition. Traffic operations at this location improve despite the fact that the Preferred Alternative adds an exclusive pedestrian phase (during which all traffic is stopped, and pedestrians may cross all approaches), and controls the southbound Arborway as well as the northbound Arborway.

### **Centre Street / Upper Arborway / Orchard Street**

In the Preferred Alternative, the Centre Street / Upper Arborway / Orchard Street intersection is slightly closer to the Arborway / Centre Street intersection, at only about 75 – 100 feet away. Because of the close spacing of the intersections, and the potential for queued vehicles to block access to and from Upper Arborway and Orchard Street, it is recommended that the intersection of Centre Street / Upper Arborway / Orchard Street be signalized and coordinated with the traffic signal at Centre Street / Arborway.

### **Arborway Adjacent to the Arboretum**

The recommended improvements for this section include restoration of historic tree plantings and enhancements to the Arborway's pedestrian and bicycle system. The Preferred Alternative in this section is shown in Figure 6-17.

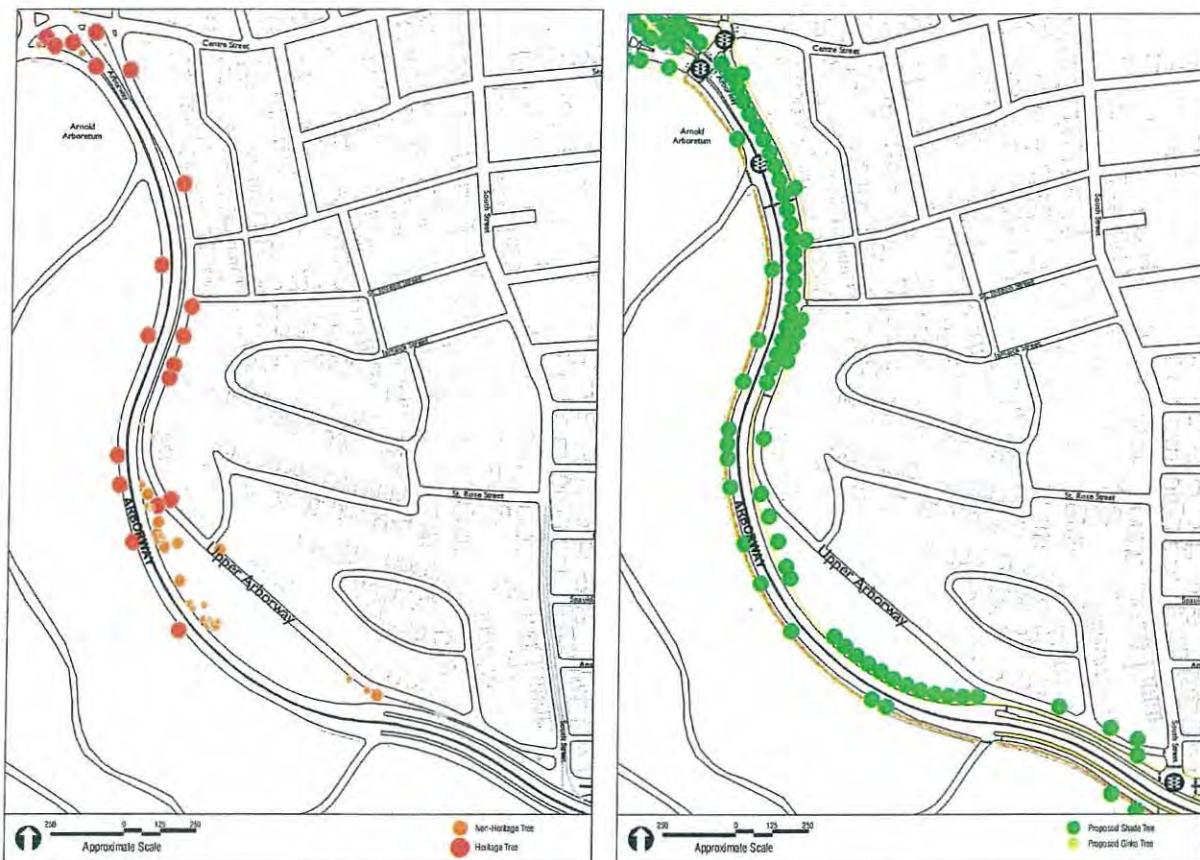


**Figure 6-17 Preferred Alternative – Arborway Adjacent to the Arboretum**

### Historic Landscape

- The character and dimensions of the historic landscape are not changed significantly in this section of the Arborway.

- The rows of Olmsted avenue tree are enhanced by replacing dead and poor health avenue trees, filling gaps in the rows of avenue trees, and restoring the rows of avenue trees where they were lost: in the median between the Arborway and Upper Arborway where there is adequate width; and as far south toward South Street as the width allows. Figure 6-18 shows the proposed tree removals and tree plantings.



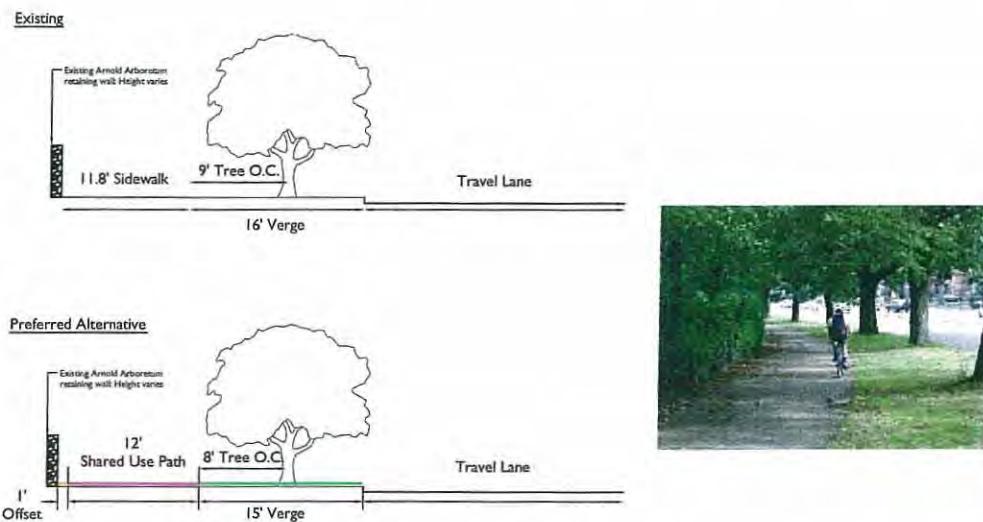
**Figure 6-18 Tree Removals (left) and Tree Plantings (right) – Arborway Adjacent to the Arboretum**

**Table 6-5 Arborway Tree Count Summary – Arborway Adjacent to the Arboretum**

	Existing Trees	Removals	New Tree Plantings	Net Gain or Loss
Heritage shade trees	Good or fair condition	50	0	
	Poor condition or dead	13	13	
Non-heritage shade trees	Good or fair condition	57	19	
	Poor condition or dead	11	9	
<b>TOTAL Shade Trees</b>	<b>131</b>	<b>41</b>	<b>57</b>	<b>+16</b>
Ornamental/evergreen trees	Good or fair condition	0	0	
	Poor condition or dead	0	0	
<b>TOTAL Evergreen/Ornamental Trees</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

## **Pedestrian and Bicycle**

- The shared-use pedestrian / bicycle path crosses the Arborway at the Centre Street traffic signal. On the western side of the Arborway, the shared-use path continues southward adjacent to the Arnold Arboretum wall. A cross section of the path in this area is shown in Figure 6-19. Minor modifications of the existing sidewalk are required to create the 12-foot wide shared use path. The path would be offset from the Arboretum wall by one foot. The path runs parallel to a row of Olmsted-era heritage trees.



**Figure 6-19 Cross-Section Showing Shared-Use Path – Arborway Near Arnold Arboretum Main Entrance, Facing North**

### **Pedestrian Crossing of the Arborway at Arnold Arboretum Gate**

The Preferred Alternative retains the existing signalized pedestrian crossing of the Arborway mainline located near the main Hunnewell Gate to the Arnold Arboretum. However, it is recommended that the crossing be made more visible. The traffic signal heads remain mounted on poles at the sides of the road and in the median between Arborway southbound and Arborway northbound. The signal heads are replaced, and the existing 8-inch diameter signal lenses are replaced with 12-inch traffic signal lenses. The visibility of the pedestrian crossing is enhanced with highly visible ladder-style pavement markings and signs in advance of the crossing warning of the pedestrian crossing and the traffic signal ahead. In addition, the adjacent unsignalized pedestrian crossing of the Upper Arborway is improved so that it provides better visibility to drivers and better notice to pedestrians that it is an unsignalized crossing. The crosswalk is raised and marked with highly visible pavement markings. Signs are added to the median to alert pedestrians to the fact that the Upper Arborway crossing is unsignalized.

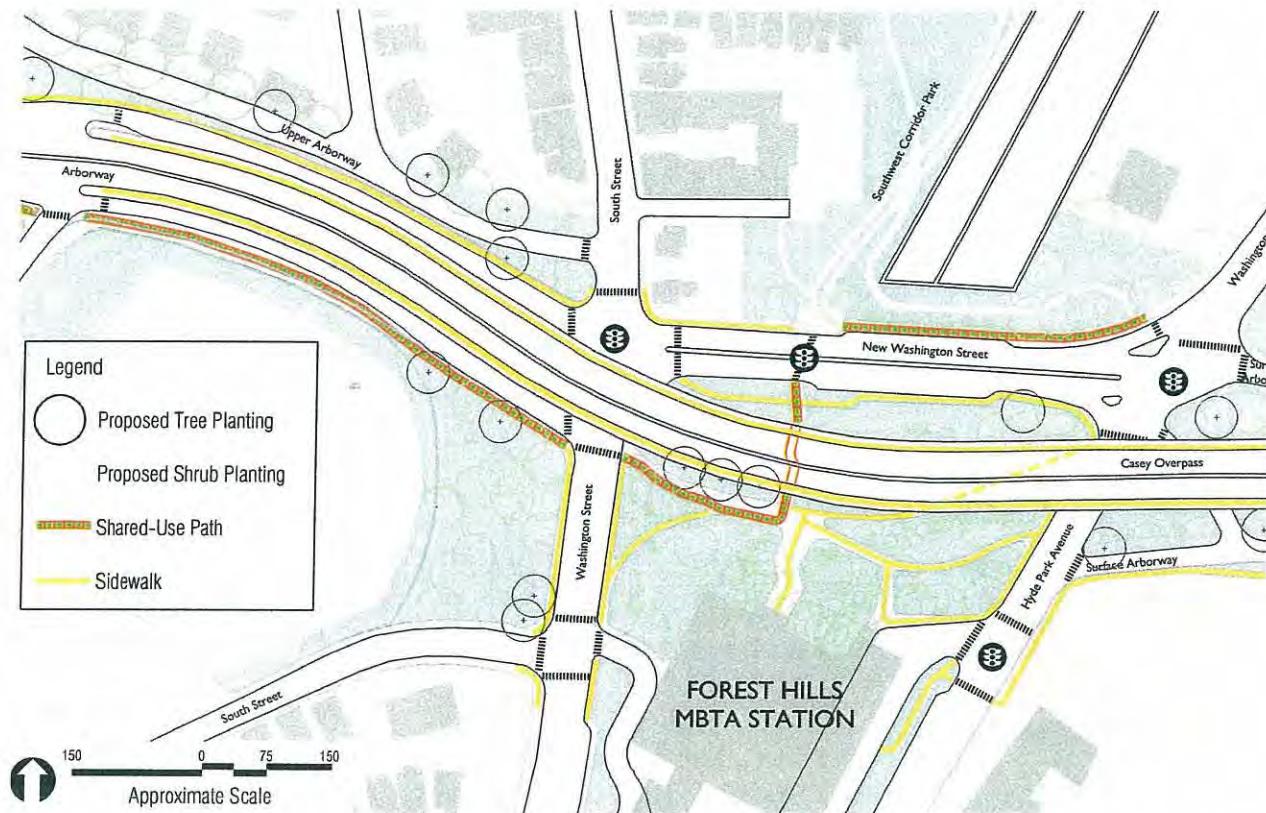
### **Motor Vehicle Traffic**

The roadway design and traffic circulation do not change significantly in the section of the Arborway adjacent to the Arnold Arboretum, between Centre Street and South Street.

### **Forest Hills and Shea Circle**

In the Forest Hills area of the Arborway, changes to the landscape and the transportation system are constrained by the presence of the Casey Overpass. In addition, the Arborway corridor must also accommodate the MBTA's access needs for Forest Hills station and the 500 Arborway facility, as well as the ongoing planning for the Arborway Yard

bus facility and the Arborway Trolley restoration. Finally, heavy traffic demand and local traffic access requirements limit the potential for major roadway changes. As a result of these constraints, no significant changes to roadway design and traffic circulation are proposed for Forest Hills. However, the Preferred Alternative includes significant landscaping and pedestrian and bicycle improvements. Figure 6-20 shows the Preferred Alternative in the Forest Hills area.

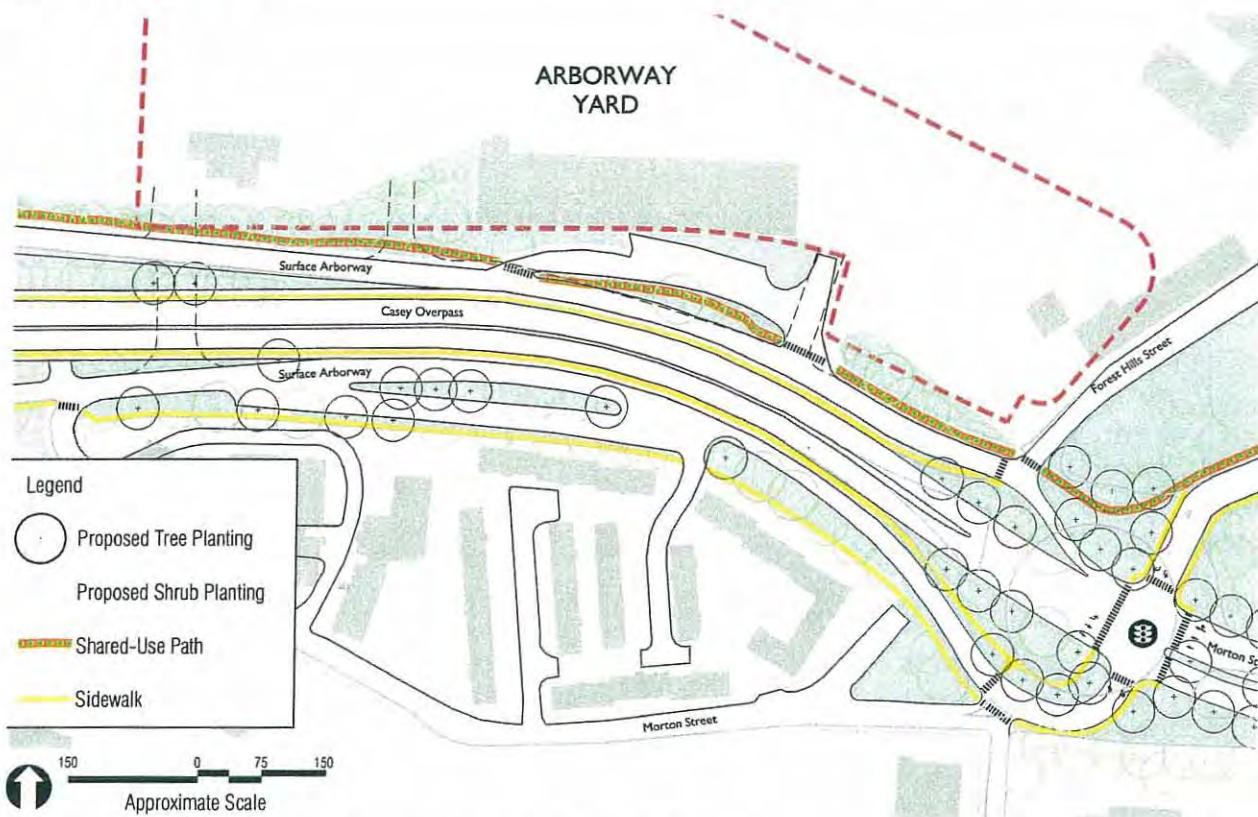


**Figure 6-20 Preferred Alternative – Forest Hills**

At Shea Circle, the signalized intersection option (Alternative 2) was identified as the Preferred Alternative. Although it increases the overall delay for traffic relative to the existing rotary and the modern roundabout option (Alternative 1), the signalized intersection still operates with acceptable levels of congestion and delay during the commuter peak hours. In addition, it offers the following advantages over the existing rotary and over the modern roundabout.

- The signalized intersection creates a more recognizable gateway for Franklin Park, and is more like the original Olmsted design for this location than the current rotary or the modern roundabout option.
- The signalized intersection provides better pedestrian and bicycle access because the crossings are signal-protected. This is especially important because this is a major connection between public transportation at Forest Hills and the Franklin Park, as well as the Shattuck Hospital.

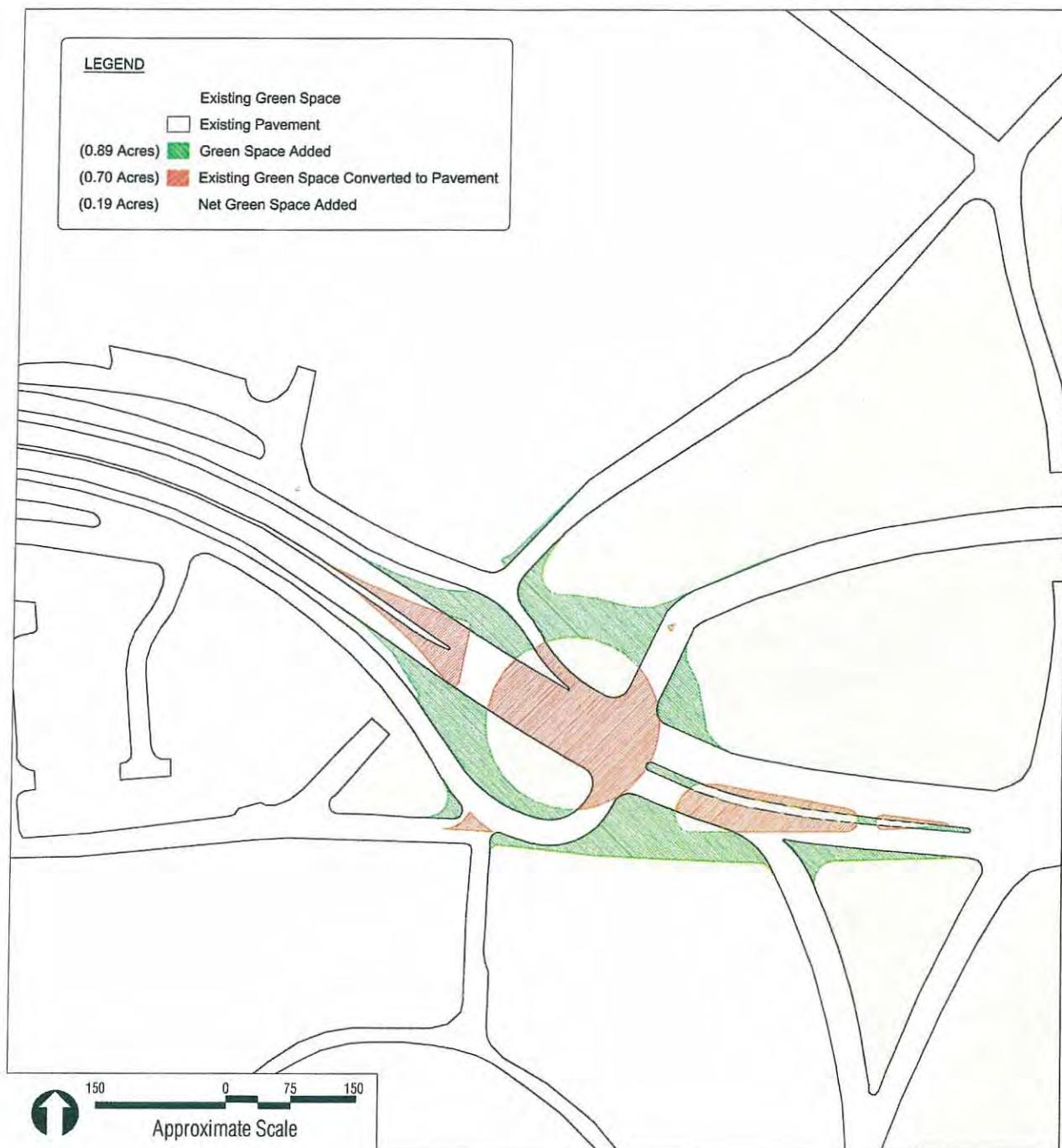
The Preferred Alternative for Shea Circle is shown in Figure 6-21.



**Figure 6-21 Preferred Alternative – Shea Circle**

### **Historic Landscape**

- Due to the major changes to the historic character of the Arborway resulting from the construction of the Casey Overpass and the Southwest Corridor project, the potential for historic preservation and rehabilitation is limited.
- Rebuilding Shea Circle as a signalized intersection eliminates a significant amount of pavement and replaces it with green space. Some of this green space is lost Olmsted landscape, while other space was not park space in the original Olmsted design. In particular, the Preferred Alternative restores a large amount of Olmsted green space on either side of the Circuit Drive entry to Franklin Park. The enhanced green space enables planting new avenue trees along the edges of the roadways, in keeping with the historic character. Figure 6-22 shows the change in paved area and green space at Shea Circle.



**Figure 6-22 Changes to Paved Area and Park Space – Shea Circle**

- Some of the Arborway historic character is enhanced by planting avenue oak trees and shrubs where possible along the surface. Most of these plantings are in green space adjacent to the Casey Overpass and along the edges of the surface Arborway between Washington Street / Hyde Park Avenue and Shea Circle. The trees and shrubs to be removed, and those to be planted, are shown in Figures 6-23 and 6-24, while the effect of these plantings on the visual environment is shown in Figures 6-25 and 6-26.

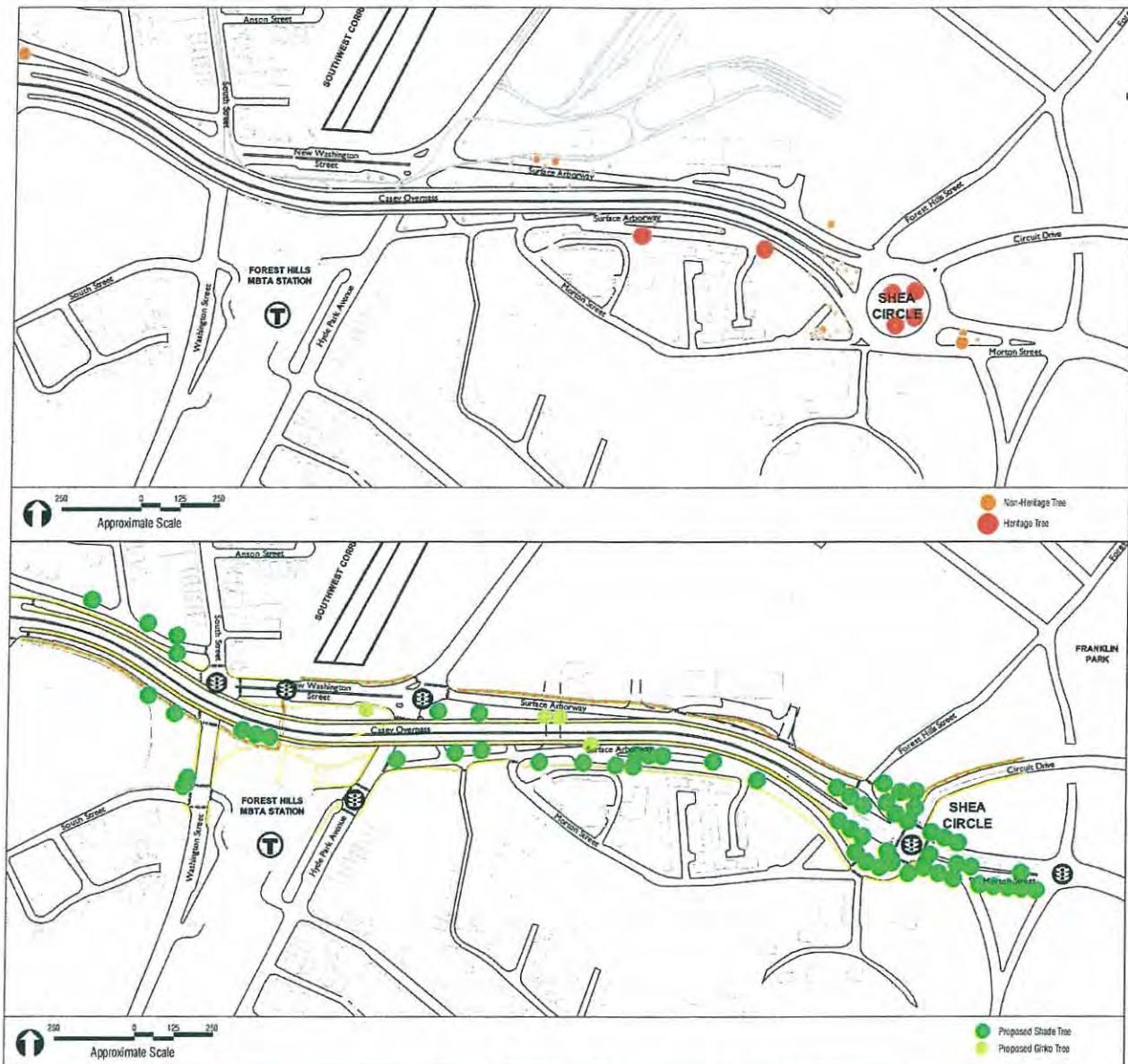


Figure 6-23 Tree Removals (top) and Tree Plantings (bottom) – Forest Hills to Shea Circle

Table 6-6 Arborway Tree Count Summary – Forest Hills to Shea Circle

	Existing Trees	Removals	New Tree Plantings	Net Gain or Loss
Heritage shade trees				
Good or fair condition	13	4		
Poor condition or dead	2	2		
Non-heritage shade trees				
Good or fair condition	187	30		
Poor condition or dead	20	16		
<b>TOTAL Shade Trees</b>	<b>222</b>	<b>52</b>	<b>58</b>	<b>+6</b>
Ornamental/evergreen trees				

Good or fair condition	87	3		
Poor or dead condition	12	0		
<b>TOTAL Evergreen/Ornamental Trees</b>	<b>99</b>	<b>3</b>	<b>4*</b>	<b>+1</b>
*Proposed new Gingkoes				

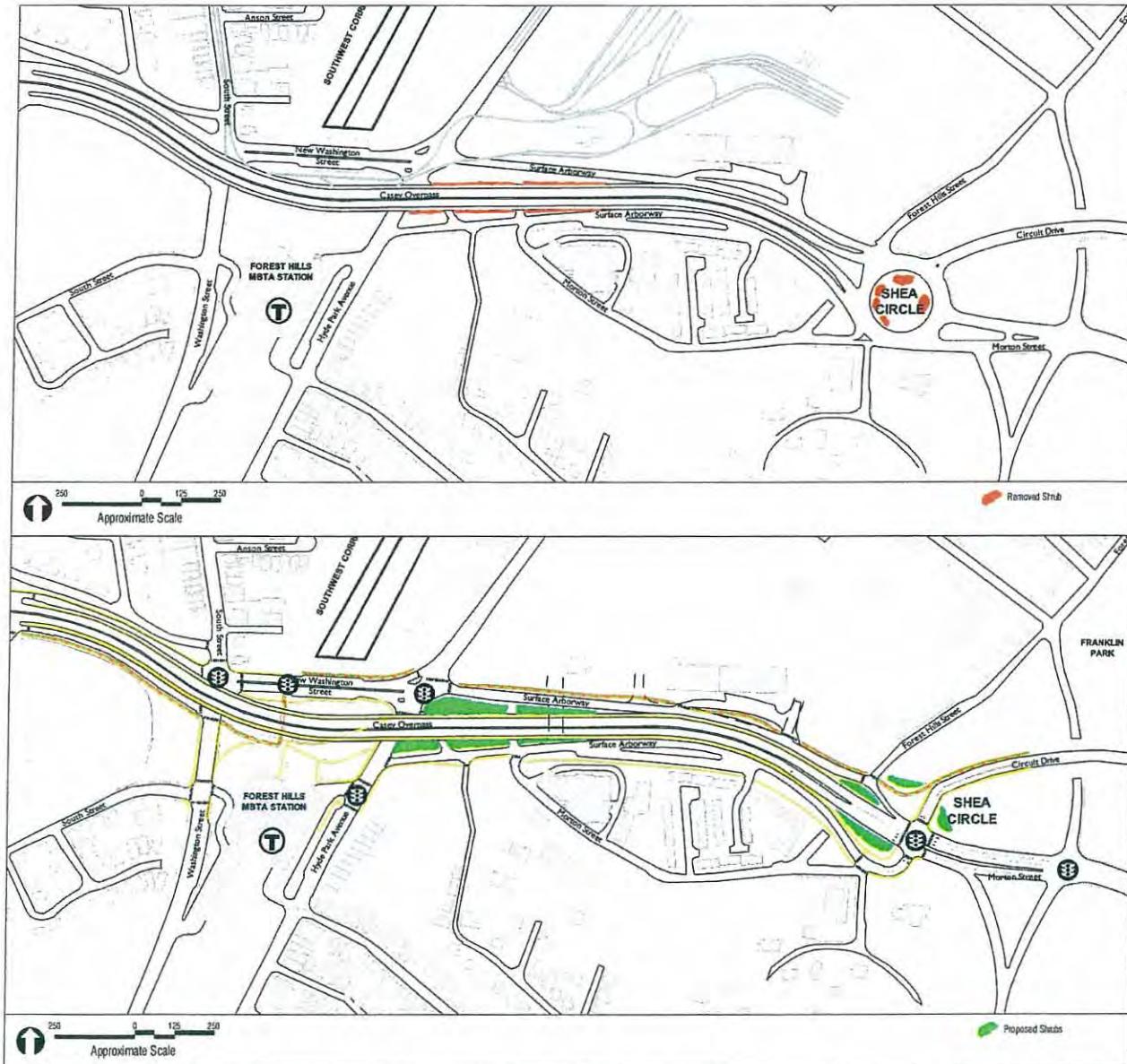


Figure 6-24 Shrub Removals (top) and Shrub Plantings (bottom) – Forest Hills to Shea Circle



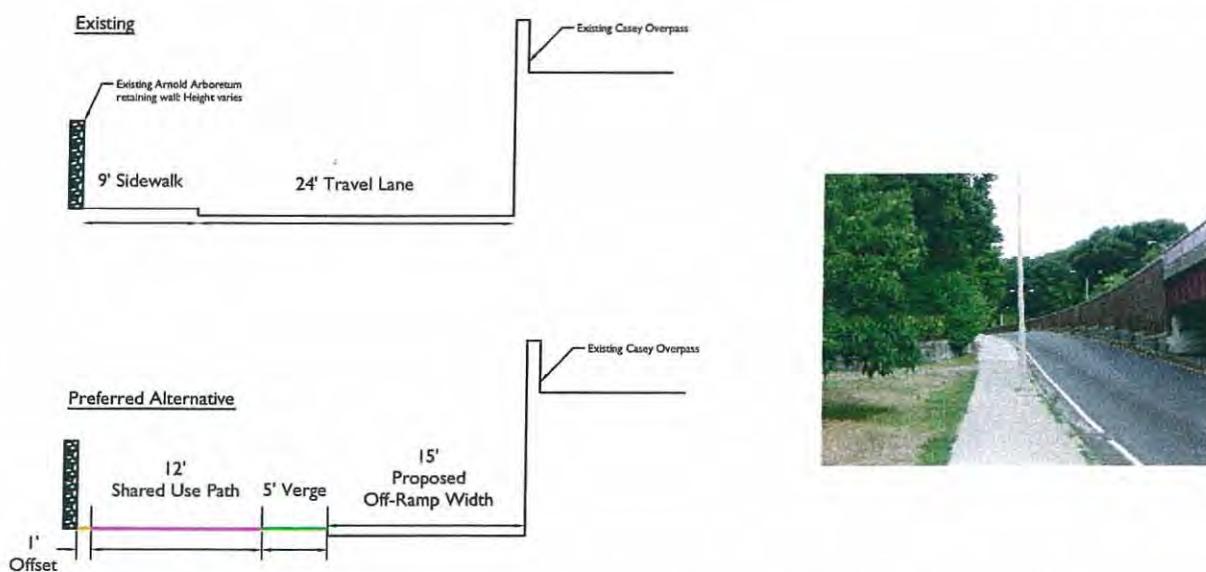
Figure 6-25 Existing Conditions at Base of Casey Overpass Approaching Shea Circle



Figure 6-26 Proposed Shrub Planting to Screen Parking Lot

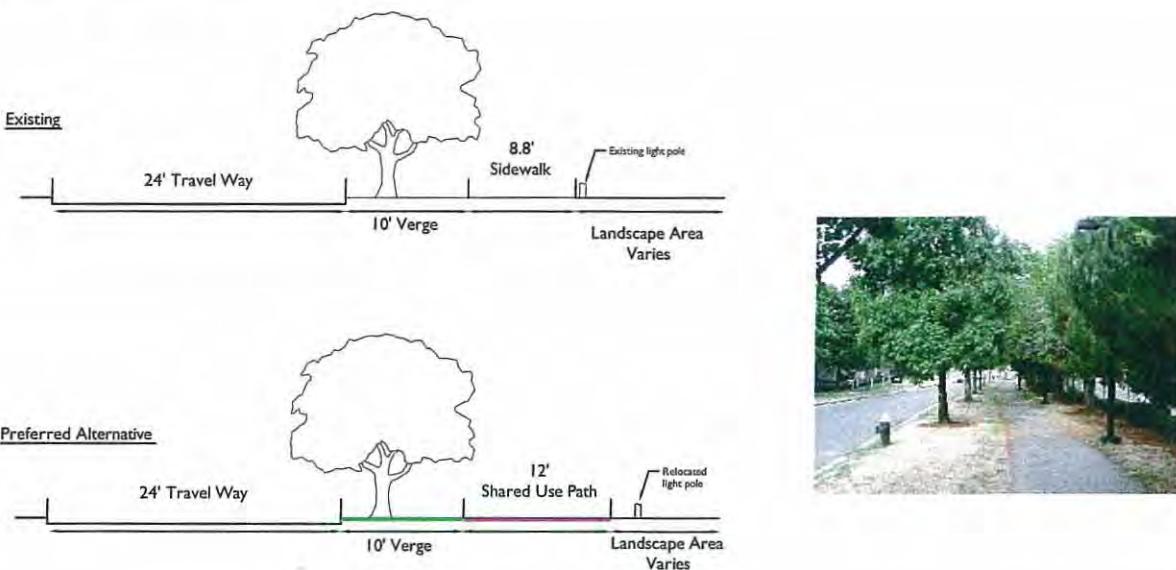
## Pedestrian and Bicycle

- The shared-use pedestrian / bicycle path continues along the western edge of the Arborway, adjacent to the Arnold Arboretum wall, until it reaches the Casey Overpass.
- At the beginning of the Casey Overpass, the shared-use path follows the southbound off-ramp to South Street. In order to accommodate the shared-use path, the existing sidewalk must be widened. At the top of the ramp, the travel way of the off-ramp is narrowed to 15 feet, allowing for existing sidewalk to be widened to 12 feet. The path is offset from the wall by one foot, and has a 5-foot wide verge between the path and the roadway as shown in Figure 6-27. Beyond the end of the retaining wall, the path widens into the existing green space, allowing the lower part of the ramp to remain 24 feet wide and accommodate two lanes at the South Street intersection.



**Figure 6-27 Cross-Section Showing Shared-Use Path – Off-Ramp from Arborway near Arnold Arboretum, Facing Northwest**

- From the bottom of the Arborway off-ramp, the shared-use pedestrian / bicycle path crosses South Street to the Forest Hills Station. The path runs beneath the Casey Overpass and crosses New Washington Street at the existing pedestrian signal at the Southwest Corridor Park.
- From here, the shared-use path continues along the northern edge of the Arborway corridor until it reaches Franklin Park. The shared-use path crosses Washington Street at the northern signal-protected crossing at the intersection of Washington Street / Surface Arborway / Hyde Park Avenue / New Washington Street, runs along the 500 Arborway / Arborway Yard facility's frontage, and enters Franklin Park at Circuit Drive. A potential cross-section for the path along the edge of the 500 Arborway / Arborway Yard facility is shown in Figure 6-28. The design of the shared-use path will be consistent with the design of the MBTA facility.



**Figure 6-28 Cross-Section Showing Shared-Use Path – Arborway Near 500 Arborway, Facing West**

- The Arborway on-ramp roadway from South Street is narrowed to provide a continuous sidewalk from South Street up to the existing short segment of sidewalk opposite the end of the Casey Overpass sidewalk. This sidewalk then continues north along eastern edge of the Arborway and Upper Arborway to provide a continuous sidewalk to the Murray Circle area.
- A neckdown is provided at the top of the Arborway on-ramp, between the Casey Overpass sidewalk and the sidewalk along the edge of the on-ramp. Due to the curve of the on-ramp and the retaining wall, this neckdown is necessary to provide adequate sight distance for pedestrians crossing from the Casey Overpass to the edge of the on-ramp.
- There are currently no crosswalks at the eastern and northern crossings of the South Street / Washington Street / New Washington Street / Arborway Ramps intersection. The ongoing Arborway Trolley restoration project will involve redesigning and rebuilding this intersection. The trolley restoration project should review the possibility of adding crosswalks, and making the necessary changes to the signal controls and signal timing.
- The Preferred Alternative's signalized intersection at Morton Street / Circuit Drive / Casey Overpass / Arborway provides signal-protected crossings, which significantly improves pedestrian and bicycle conditions relative to the current conditions at Shea Circle.

### **Motor Vehicle Traffic**

The Preferred Alternative entails minimal roadway design or traffic circulation changes in the Forest Hills area. However, there are minor potential improvements that should be pursued through other planning or design efforts:

- The intersection of South Street / Washington Street / New Washington Street / Arborway Ramps has an exclusive pedestrian phase, but does not have crosswalks or pedestrian signals on the eastern and northern sides of the intersection. The MBTA's Arborway Trolley restoration project will require reconfiguring this intersection. This redesign should incorporate crosswalks and pedestrian signals at all crossings.
- The Boston Transportation Department has an outstanding contract to install a new traffic signal controller at intersection of Surface Arborway / Washington Street / New Washington Street / Hyde Park Avenue. This contract includes a revised traffic signal plan that will enable the eastbound New Washington Street signal phase and the westbound Surface Artery signal phase to be split, eliminating the existing confusion between the westbound left turns and the eastbound through-movements.

The Preferred Alternative is consistent with the MBTA's planning efforts for the Arborway Yard bus maintenance and storage facility. The Preferred Alternative calls for the Arborway corridor's continuous, shared-use bicycle / pedestrian path to pass in front of 500 Arborway / Arborway Yard, within the historic Arborway alignment. The MBTA draft plan includes this connection. In addition to this connection along the southern edge of the site, the MBTA draft plan provides for a landscaped buffer around the 500 Arborway / Arborway Yard site, along the Washington Street edge of the site, along the rear of the site, and along the Forest Hills Street edge of the site.

### ***Shea Circle***

The existing Shea Circle rotary performs well from a traffic operations perspective, but it occupies a large area and is an obstacle for pedestrians and bicyclists traveling to and from Franklin Park. The Preferred Alternative replaces the existing rotary with an at-grade signalized intersection, with standard four-approach layout. The Casey Overpass is the western leg of the intersection, Morton Street is the eastern leg, Circuit Drive is the northern leg, and the Surface Arborway eastbound is the southern leg. All legs of the intersection are two-way, with the exception of the Surface Arborway eastbound, which is one-way toward the intersection. The Surface Arborway eastbound approach curves to intersect with Casey Overpass / Morton Street at a right angle, providing better sight lines and better traffic operations than the roadway's current oblique approach to Shea Circle. The Surface Arborway westbound is accessible from the intersection, and diverges from the Casey Overpass westbound approach to continue at the surface past the MBTA 500 Arborway facility.

The heaviest volumes at the intersection are the Casey Overpass – Morton Street through-volumes. This is a major commuter route, and the volumes show the influence of commuter traffic, with Morton Street to Casey Overpass westbound traffic heavier in the AM peak hour and Casey Overpass to Morton Street eastbound traffic heavier in the PM peak hour. Most of the current traffic movements accommodated at Shea Circle are also possible in the new intersection design. Forest Hills Street no longer connects directly to the intersection, but Forest Hills Street traffic can reach the intersection by taking Cemetery Road to Morton Street. Circuit Drive left turns to Morton Street eastbound are prohibited, but the few vehicles that currently make this movement via Shea Circle can make this connection in the Preferred Alternative via Surface Arborway westbound to Forest Hills Street to Cemetery Road to Morton Street. The Preferred Alternative also provides an exclusive pedestrian crossing phase.

**Table 6-7 Preferred Alternative Traffic Operations Summary – Forest Hills to Shea Circle**

Location	Peak Hour	2002 Existing Conditions	2012 No-Build Conditions	Preferred Alternative2012 Build Conditions
		Level of Service	Level of Service	Level of Service
<b>Arborway / South Street</b>	AM	F	F	F
	PM	F	F	F
<b>New Washington Street / Washington Street</b>	AM	C	C	C
	PM	C	C	C
<b>Shea Circle</b>				
	Morton Street WB	A	B	-
	AM	A	A	-
	PM	A	A	-
Circuit Drive	AM	F	F	-
	PM	A	A	-
Forest Hills Street	AM	C	D	-
	PM	A	B	-
Overpass / Arborway EB	AM	A	A	-
	PM	A	A	-
Arborway Surface EB	AM	A	A	-
	PM	E	F	-
<b>Casey Overpass / Morton Street / Arborway / Circuit Drive</b>	AM	-	-	D
	PM	-	-	C
<b>Arborway / Forest Hills St.</b>				
	Forest Hills Street SB	-	-	C
	AM	-	-	-
	PM	-	-	B

## 6.3 Short-Term Improvements

The Preferred Alternative entails significant changes to roadway alignment and traffic flows, in addition to landscaping and access for pedestrians and bicycles. As a result, the Preferred Alternative will require a major financial investment (as discussed in Section 6.4), as well significant planning, design, and environmental review efforts. Therefore, the Preferred Alternative will take many years to implement.

There are a number of improvements, however, that can be made without major changes to roadway alignments and traffic flows. These improvements include historic landscape enhancements, improvements in pedestrian and bicycle access, and traffic that can be implemented in the short-term. These short-term improvements are based largely on elements of the Preferred Alternative that can be implemented without major roadway changes, significant design efforts, and large financial investments.

### 6.3.1 Historic Landscape

The proposed short-term enhancements to the historic landscape are focused mainly on changes to plantings within the existing green spaces. The general guidelines for the short-term historic landscape enhancements are:

- Trees in Good and Fair conditions shall be maintained regularly, pruned, and fertilized.
- Remove dead trees and trees that are in poor health and cannot be saved. These removals will include both heritage trees and non-heritage trees.
- Replace the heritage trees that were removed for health reasons with plantings that are appropriate to the historic design. Typically, this means replacing these heritage trees with red oaks in the characteristic rows lining the roadways.
- Wherever possible, fill existing gaps in the rows of red oaks lining the roadways, or extend the rows of red oaks lining the roadways in a manner consistent with the original Olmsted design character. These “infill” trees respect the existing roadway alignments, and should not interfere with the proposed long-term Preferred Alternative. Instead, these plantings should represent an early implementation step for the Preferred Alternative’s landscape treatment plan.
- No shrub plantings

The proposed short-term tree removals are shown in Figure 6-29 for the Murray Circle to Kelley Circle segment of the Arborway, in Figure 6-30 for the section of the Arborway from Murray Circle to South Street, and in Figure 6-31 for the section of the Arborway in the Forest Hills / Shea Circle area. Table 6-5 summarizes the proposed short-term tree removals (for health reasons only) and tree plantings.

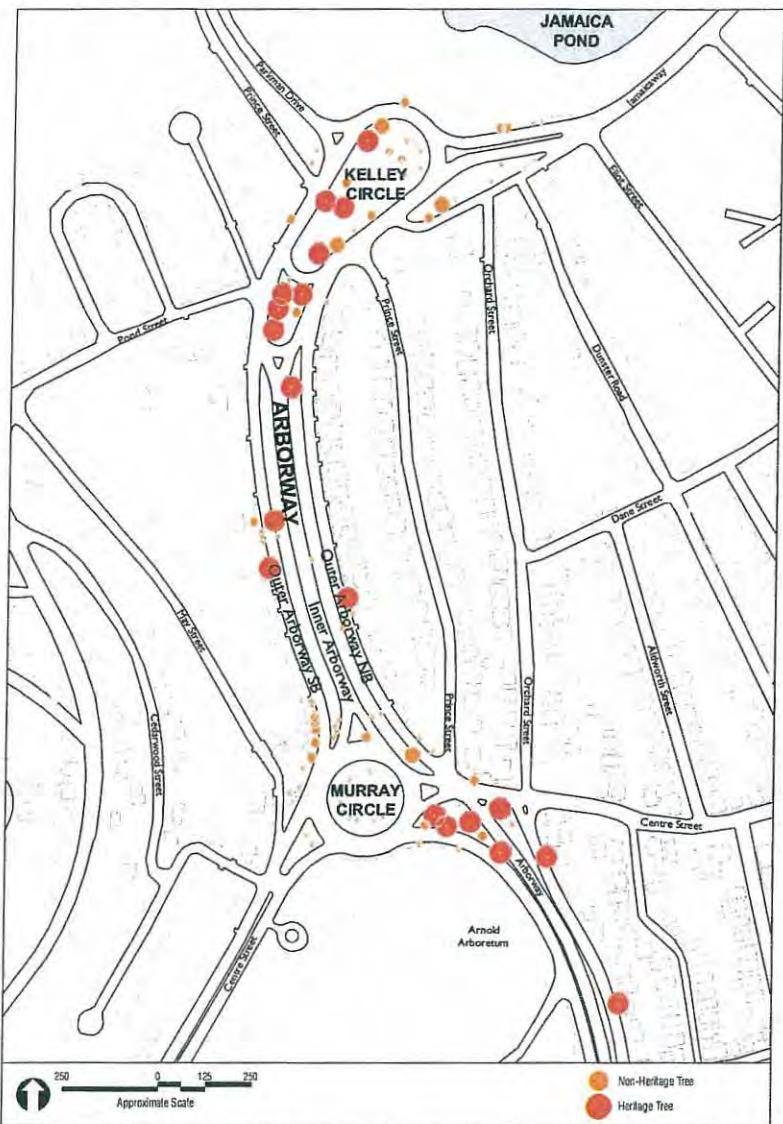


Figure 6-29 Short Term Tree Removals – Murray Circle to South Street

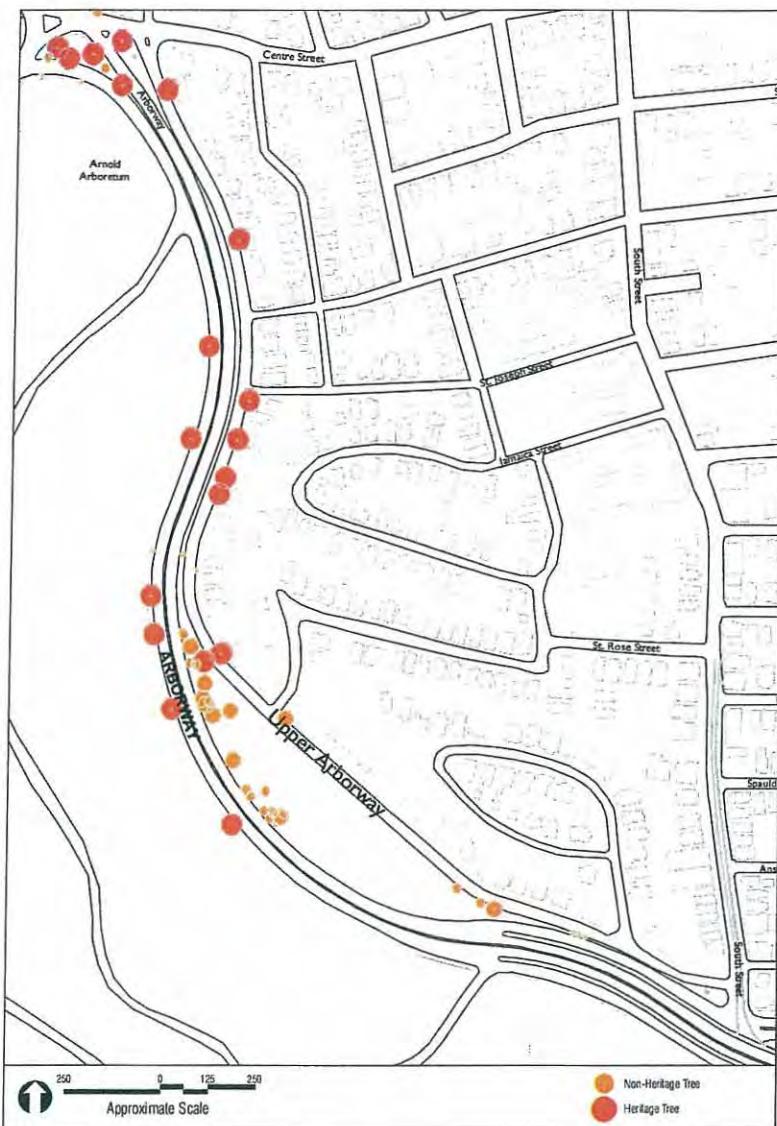


Figure 6-30 Short Term Tree Removals – Arborway Adjacent to Arboretum

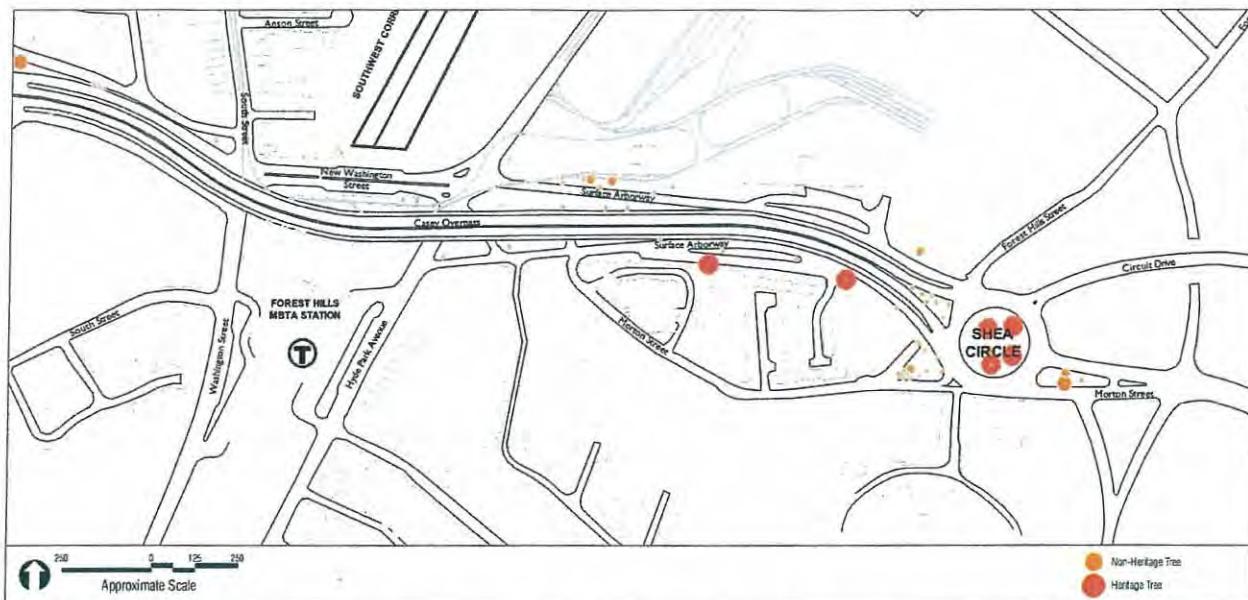


Figure 6-31 Short Term Tree Removals – Forest Hills to Shea Circle

Table 6-8 Proposed Short-Term Plantings

	Number of Trees
<b>Tree Removals</b>	
Heritage Trees: Dead or Poor Health	24
Non-Heritage Trees: Dead or Poor Health	73
<b>Total</b>	<b>97</b>
<b>Proposed Tree Plantings (Red Oaks in Characteristic Rows)</b>	
	132

The short-term landscape improvements do not include the corridor-wide upgrades to the street lighting that are included in the long-term Preferred Alternative. Due to the length and width of the Arborway corridor, the street lighting improvements involve a significant expense, and the installation of new street lighting could be accomplished most efficiently when the Preferred Alternative's major roadway changes were executed.

### 6.3.2 Transportation Improvements

Most of the other short-term recommendations are pedestrian and bicycle improvements, although many also affect motor vehicle traffic. These recommended changes improve pedestrian and bicycle access at key locations, and implement portions of the shared-use pedestrian / bicycle path that can later be connected to form the continuous path running the length of the Arborway as recommended in the Preferred Alternative.

### Kelley Circle Area

The short-term recommendations in the Kelley Circle area are shown in Figure 6-32.

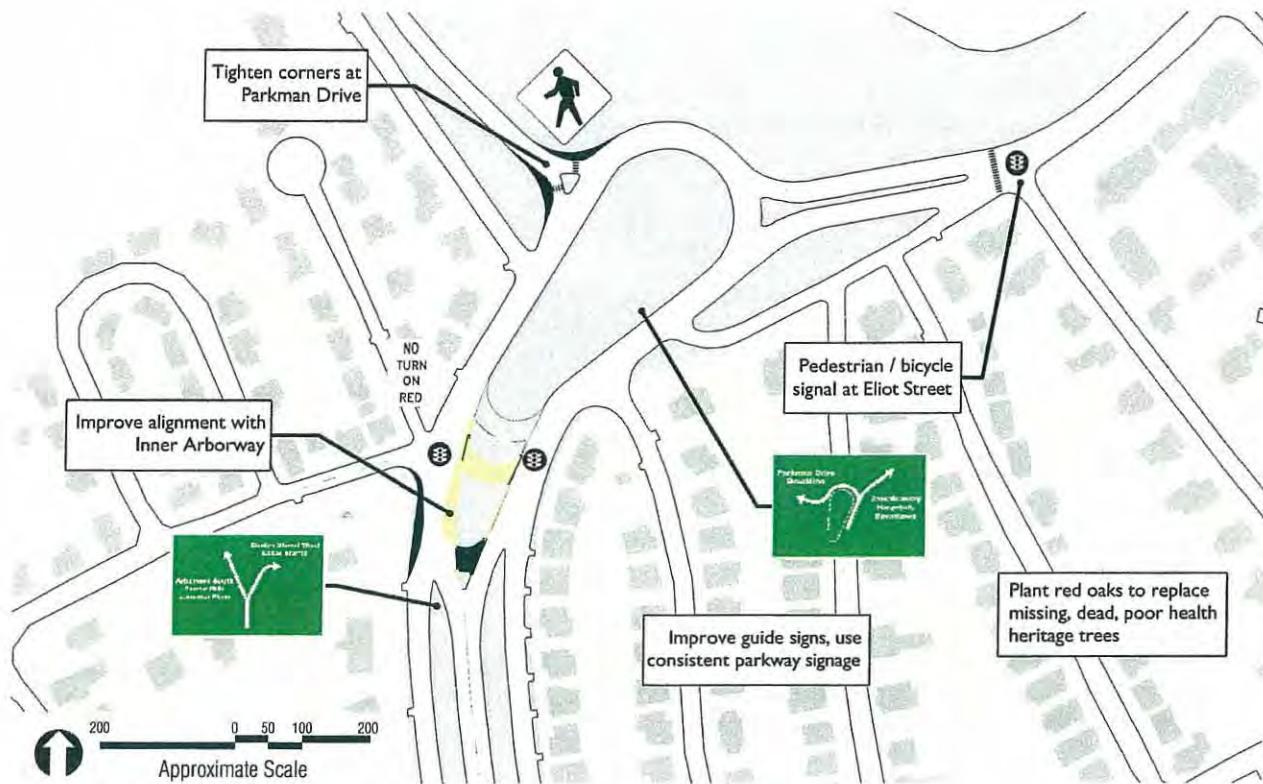


Figure 6-32 Short Term Recommendations – Kelley Circle

**Jamaicaway / Eliot Street.** The short-term recommendations call for installing a signalized pedestrian and bicycle crossing of the southern end of the Jamaicaway at Eliot Street. This recommendation was also made in the MDC's 1999 *Arborway Traffic Calming Study*. This is an important pedestrian and bicycle desire line between the Pondside neighborhood and Jamaica Pond. Pedestrians and bicyclists currently cross at this location, in spite of the fact that they must cross four lanes of high-volume, high-speed traffic with poor sight lines.

**Jamaicaway at Kelley Circle.** The lane assignment at the Kelley Circle to Jamaicaway diverge is currently not clear. North of the Inner Arborway / Outer Arborway Northbound merge, Kelley Circle has three lanes. Jamaicaway northbound as it exits Kelley Circle has two lanes, and Kelley Circle as it circulates around toward Parkman Drive has two to three lanes. The pavement markings in the section of Kelley Circle approaching the Jamaicaway should be improved so that traffic circulation is clarified: the left lane must continue around Kelley Circle, the right lane must go north along the Jamaicaway (in the right lane), and the middle lane could either continue circulating around Kelley Circle or could go north on the Jamaicaway (in the left lane). Signage could be added in the Kelley Circle island to indicate this lane assignment.

**Parkman Drive at Kelley Circle.** Parkman Drive's existing wide entry and exit lanes currently enable high vehicle speeds. This creates difficult crossing conditions for pedestrians and bicyclists at this major crossing for access to and from Jamaica Pond. In the short-term, the Parkman Drive approach lane and exit lane should be narrowed to reduce vehicle entry and exit speeds, and the pedestrian and bicycle crossing should be emphasized with signs and pavement markings.

#### Arborway / Pond Street

- The signalized intersection of Arborway / Pond Street, at the southwestern corner of Kelley Circle, currently provides an exclusive pedestrian phase. However, field observations indicate that southbound vehicles turning right onto Pond Street frequently ignore the red signal, often without stopping and at fairly

high speeds. Although it is safe for southbound vehicles to turn right on red during the Pond Street phase, it is unsafe for southbound vehicles to turn right on red during the exclusive pedestrian phase. Therefore, the southbound approach should be signed for “No Turn on Red.” This change would have a negligible effect on traffic operations at this intersection.

- The southbound approach to this intersection is currently directly aligned with Outer Arborway Southbound, and traveling via Inner Arborway requires a tight S-turn from the left lane. The southbound approach to this intersection should be re-aligned so that it is more directly aligned with the Inner Arborway, and directed away from the Outer Arborway Southbound. This would reduce the volume of traffic using the Outer Arborway Southbound, which is currently about two and a half times the volume of traffic that uses the Inner Arborway southbound.
- The short-term recommendations include reconfiguring Kelley Circle’s southbound-to-northbound U-turns. There are currently two channelized turns: the first is north of Pond Street and provides access for Parkman Drive traffic to head northbound on the Jamaicaway, the second is at the southern end of Kelley Circle, and provides access from Pond Street to the northbound Jamaicaway. Traffic demand for both of these turns is relatively light, totaling approximately 70 vehicles in the AM peak hour and 140 vehicles in the PM peak hour. The short-term recommendation to redirect the Kelley Circle southbound approach toward the Inner Arborway southbound would reduce the length of the southern U-turn to only 35 feet, which could create an unsafe situation. It is recommended that the two U-turns be combined into a single U-turn that provides access for both Parkman Drive traffic and Pond Street traffic.

### **Murray Circle**

Most of the Murray Circle elements of the long-term Preferred Alternative involve significant changes to roadway design, traffic flows, and traffic controls. However, there are some short-term improvements that could improve safety. These improvements are shown in Figure 6-33.

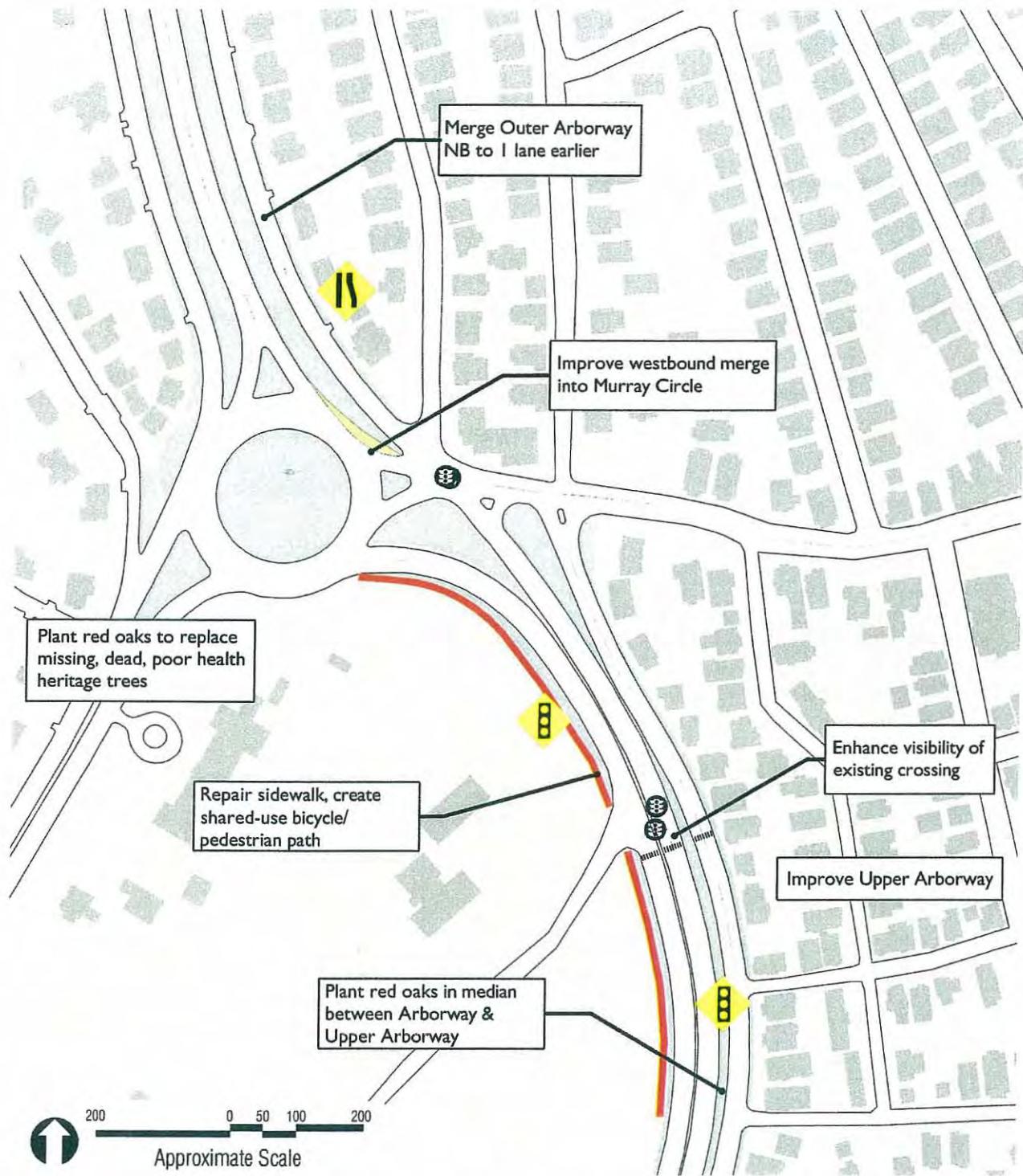


Figure 6-33 – Short Term Improvements – Murray Circle

- Improve the signage and pavement markings for pedestrian crossings. Provide more visible ladder-type pedestrian crosswalks, with advance signage directing rotary traffic to yield to pedestrians.
- The Outer Arborway Northbound traffic is currently directed to merge from two lanes to one approximately 150 feet south of the Outer Arborway Northbound merge with Inner Arborway. This creates an abrupt merge of four lanes to three lanes as northbound traffic enters Kelley Circle. The Outer Arborway Northbound should be

directed to merge from two lanes to one lane earlier, closer to the southern entry. This would slow traffic and create more of a buffer for the residences and the trees along the Outer Arborway Northbound.

- The signalized intersection of Arborway Northbound / Centre Street currently has all pole-mounted traffic signal heads. Traffic signal mast-arms should be installed to improve visibility for the signal heads at this intersection.

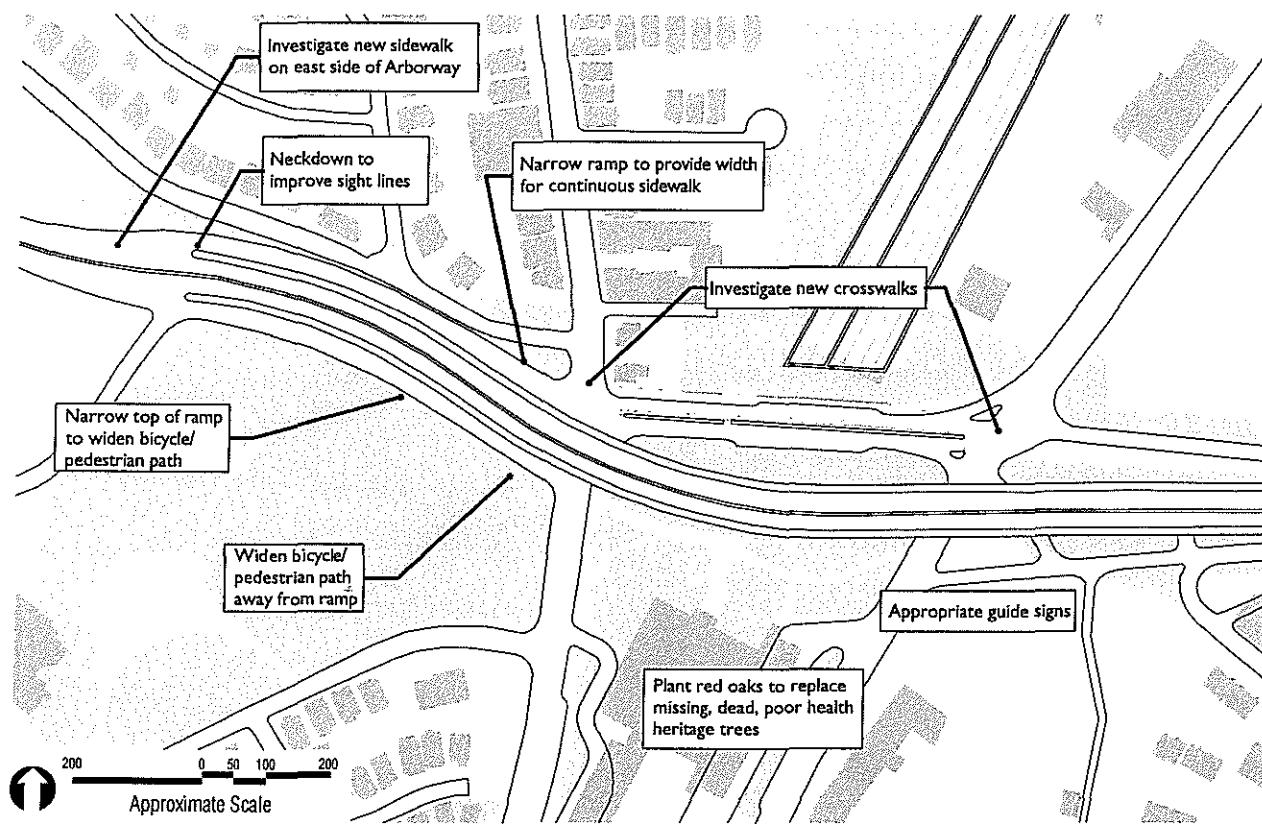
### **Arborway Adjacent to the Arnold Arboretum**

The Preferred Alternative's transportation improvements for the section of the Arborway adjacent to the Arnold Arboretum do not require changes to the roadway design, and could be implemented in the short-term.

- The sidewalk along the western edge of the Arborway should be reconstructed to provide the continuous shared-use pedestrian / bicycle path, between the Arboretum wall and the row of avenue oak trees.
- The existing signalized pedestrian crossing at the Arboretum's main Hunnewell Gate should be enhanced with larger, more visible signal lenses, improved signage and enhanced pavement markings.
- The adjacent unsignalized pedestrian crossing of the Upper Arborway should be rebuilt as a raised crosswalk with better signage and better pavement markings so that it provides better visibility to drivers. Signs should be added in the median between the Arborway mainline and the Upper Arborway to inform pedestrians that it is an unsignalized crossing.
- A sidewalk should be provided along the eastern edge of the Arborway, connecting a new sidewalk along the edge of the Arborway on-ramp. This sidewalk would run along the eastern edge of the Arborway mainline from the Arborway on-ramp to the point where the Arborway mainline and the Upper Arborway converge, and are separated by a 10 – 15 foot wide median. At this point the median between the Arborway mainline and the Upper Arborway is too narrow for pedestrians to comfortably walk, so a crosswalk brings pedestrians to the eastern side of the Upper Arborway. This provides a continuous sidewalk along the eastern side of the Arborway from South Street to the Murray Circle area.

### **Forest Hills Area**

The Preferred Alternative's transportation improvements for the Forest Hills area do not require major changes to the roadway design, and could be implemented in the short-term. These improvements are shown in Figure 6-34.



**Figure 6-34 Short Term Improvements – Forest Hills**

- The Arborway on-ramp roadway from South Street should be narrowed to provide a continuous sidewalk from South Street up to the existing short segment of sidewalk opposite the end of the Casey Overpass sidewalk. This sidewalk then continues north along eastern edge of the Arborway and Upper Arborway to provide a continuous sidewalk to the Murray Circle area.
- A neckdown should be provided at the top of the Arborway on-ramp, between the Casey Overpass sidewalk and the sidewalk along the edge of the on-ramp. Due to the curve of the on-ramp and the retaining wall, this neckdown is necessary to provide adequate sight distance for pedestrians crossing from the Casey Overpass to the edge of the on-ramp.
- The shared-use bicycle / pedestrian connection between the Arnold Arboretum and Franklin Park should be improved. Way-finding signs should be installed to guide pedestrians and bicycles through the Forest Hills area between the Arboretum and Franklin Park: cross South Street at the base of the Arborway off-ramp, underneath the Casey Overpass to cross New Washington Street at the Southwest Corridor pedestrian signal, along the northern side of New Washington Street, cross Washington Street on the northern side of its intersection with Arborway / New Washington Street / Hyde Park Avenue, along the frontage of 500 Arborway / Arborway Yard to the Franklin Park entry at Circuit Drive.

Like the Preferred Alternative, the short-term recommendations are consistent with the MBTA's planning efforts for the Arborway Yard bus maintenance and storage facility.

## 6.4 Cost Estimates

Order-of-magnitude cost estimates have been developed for the Preferred Alternative and for the short-term recommendations. These cost estimates are based on the following assumptions:

- Tree removals include grinding stumps

- New tree plantings are 6-inch caliper trees
- 2002 Massachusetts Highway Department average bid prices for roadway improvements
- Full-depth excavation for new roadway construction
- Full-depth excavation for removal of roadway and replacement with green space
- Granite curbs
- Concrete sidewalks
- Bituminous asphalt shared-use bicycle pedestrian path, 12 feet wide

The following are the order-of-magnitude costs for the full, long-term Preferred Alternative.

**Table 6-9 Preferred Alternative Cost Estimate**

	<b>Cost</b>
Landscape Improvements	\$ 2,815,000
Pedestrian and Bicycle Improvements	\$ 990,000
Roadway Improvements	\$ 3,910,000
Kelley Circle to Murray Circle	\$ 2,630,000
Shea Circle	\$ 1,280,000
Traffic Signals	\$ 1,750,000
Street Lighting	\$ 2,010,000
Design, Traffic Maintenance, Contingency	\$ 6,200,000
<b>Total</b>	<b>\$ 17,675,000</b>

The following are the order-of-magnitude costs for the short-term recommendations.

**Table 6-10 Short-Term Recommendations Cost Estimate**

	<b>Cost</b>
Landscape Improvements	\$ 415,000
Pedestrian and Bicycle Improvements	\$ 320,000
Roadway Improvements	\$ 135,000
Traffic Signals	\$ 250,000
Street Lighting	\$ 0
Design, Traffic Maintenance, Contingency	\$ 560,000
<b>Total</b>	<b>\$ 1,680,000</b>

## **6.5 Outstanding Issues**

In developing the Arborway Master Plan Preferred Alternative, several issues have arisen that cannot adequately be addressed within the constraints of the data available and the scope of a master planning study. These issues are important, and must be addressed in subsequent planning and design efforts related to the Arborway Master Plan recommendations. Among these issues are detailed impacts on local access caused by the Preferred Alternative, traffic signal warrants for proposed new signals, and impacts of the proposed roadway construction on existing water mains beneath the Arborway corridor.

### **Local Access**

The Preferred Alternative reduces the amount of pavement and controls access at a number of key areas, especially at the large, wide open rotaries at Kelley Circle, Murray Circle, and Shea Circle. The recommended changes serve the Arborway Master Plan's objectives of enhancing the landscape and improving access for pedestrians and

bicycles. The proposed changes also satisfy the major regional traffic flows, without significantly increasing overall congestion. The Preferred Alternative better organizes and channels the Arborway's major traffic flows, and enables traffic to operate fairly well with significantly less paved area.

However, in order to control access and reduce roadway conflicts, the Preferred Alternative changes access and egress patterns for the Outer Arborway Southbound, the Outer Arborway Northbound, and Prince Street. This affects local traffic access for these streets and for the Pondside neighborhood. In some cases, local circulation would become more circuitous, although some local access improvements may be possible by changing the direction of some streets.

It is important to note that even though the Preferred Alternative would affect local access and egress, it should not result in any commuter traffic cutting through local streets. The Preferred Alternative accommodates all regional traffic movements without major increases in congestion at any locations. Furthermore, because the Preferred Alternative limits access to and from local streets, commuter cut-through traffic becomes less likely. The following are the Preferred Alternative's principal changes to local access and egress.

**Prince Street.** In order to avoid adding an intersection immediately south of the Kelley Circle roundabout, the Preferred Alternative proposes that Prince Street be terminated in a dead-end as it approaches Kelley Circle. This would require the residents of the southern end of Prince Street to enter and exit via Perkins Street. An alternative to this approach would be to create a roadway connection between Prince Street and Parkman Drive far enough north on Parkman Drive that it would not affect the operation of the roundabout. Another alternative would be to pursue the *Emerald Necklace Master Plan* recommendation of re-aligning Parkman Drive so that it intersects Prince Street north of the existing houses; this would enable the closure of Parkman Drive and the creation of additional park space around Jamaica Pond.

**Outer Arborway Southbound.** The Preferred Alternative recommends that the Outer Arborway Southbound provide access only to Centre Street westbound. This recommendation has a number of major benefits: it reduces peak hour traffic on the Outer Arborway Southbound by an estimated 45%, allows the Outer Arborway Southbound to be reduced from two lanes to one, minimizes conflict at Murray Circle, and enables Murray Circle to be converted to a modern roundabout. However, it also makes circulation for Outer Arborway Southbound residents difficult. In existing conditions, Outer Arborway Southbound residents can enter Murray Circle and travel in any direction.

In the Preferred Alternative, Outer Arborway Southbound residents would be directed to Centre Street westbound only. It is not possible to safely provide a vehicular connection from the Outer Arborway Southbound to the new modern roundabout at Murray Circle. Making a U-turn from the Outer Arborway Southbound back toward Murray Circle at the Centre Street / Hillcroft Road signal would require making a short, unsafe weave across a lane of traffic exiting Murray Circle to Centre Street westbound, and is not recommended.

There is another potential alternative for more conveniently accommodating Outer Arborway Southbound traffic that is safe and does not create a major burden for other area residents: Outer Arborway Southbound traffic could turn around via Hillcroft Road, and turn left at the Hillcroft Avenue traffic signal onto Centre Street to access Murray Circle. This would add minimal traffic to Hillcroft Road: the ten houses on the Outer Arborway would be expected to generate a maximum of about six or seven exiting vehicle trips during a peak hour.

**Outer Arborway Northbound and Pondside Neighborhood.** The Preferred Alternative would also affect the vehicular access and egress for the residents of the Outer Arborway Northbound and the following streets in the Pondside neighborhood: Prince Street, Orchard Street, Dunster Road, Eliot Street, Dane Street, Aldworth Street, and Holbrook Street. In the Preferred Alternative, the following connections into the Pondside neighborhood are no longer possible:

- Kelley Circle to Prince Street
- Kelley Circle to Pond Street (between Prince Street and Eliot Street), and Pond Street's connections to Orchard Street and Eliot Street)
- Murray Circle to Outer Arborway Northbound

Instead, the following vehicular connections into the Pondside neighborhood would be available, as shown in Figure 6-35:

- Kelley Circle to Eliot Street
- Murray Circle to Centre Street eastbound to Aldworth Street or Dunster Road
- Arborway northbound to Outer Arborway Northbound



**Figure 6-35 Local Vehicular Access into Pondside Neighborhood**

In the Preferred Alternative, the following connections out of the Pondside neighborhood are no longer possible:

- Outer Arborway Northbound to Kelley Circle

- Prince Street to Murray Circle

Instead, the following vehicular connections out of the Pondside neighborhood would be available, as shown in Figure 6-36:

- Pond Street to Jamaicaway northbound
- Orchard Street to Centre Street



**Figure 6-36 Local Vehicular Egress out of Pondside Neighborhood**

Some of these connections would be more circuitous for Pondside neighborhood residents than existing connections. However, the existing circulation patterns in the Pondside neighborhood represent a response to current conditions and concerns about cut-through traffic based on existing traffic flows.

Local access problems arising from the Preferred Alternative's proposed changes could be addressed by making circulation changes that are appropriate to the new roadway access patterns in the Preferred Alternative. For example, it may be advantageous to change Prince Street from one-way southbound to one-way northbound, in order to prevent Prince Street residents from needing to circulate around Outer Arborway Northbound every time they exited Prince Street. Other changes might include reversing the direction of segments of streets to make connections more direct and less circuitous. For example, making the northern half of Orchard Street one-way northbound and the northern half of Dunster Street one-way southbound might also offer benefits.

Local circulation issues should be evaluated in more detail in subsequent planning and design phases related to the Arborway Master Plan recommendations. This evaluation should entail a neighborhood-based planning process that would enable the affected residents to have direct input into the plan. It should include traffic counts on local streets to identify current traffic patterns, directional distribution of local traffic, and volumes of existing cut-through traffic. If appropriate, circulation changes could be made to enable direct local connections and to distribute traffic impacts so that certain streets are not affected disproportionately. Impacts on emergency vehicles should also be assessed.

**Traffic Signal Warrants.** The Preferred Alternative does not propose many new traffic signals. Most of the traffic signals included in the plan currently exist at or near the designated location. However, there are three locations where new signals are proposed:

- **Jamaicaway / Eliot Street.** This location is currently a critical pedestrian and bicycle desire line between Jamaica Pond, a major recreation area, and much of Jamaica Plain. This crossing currently has significant utilization by pedestrians and bicyclists, in spite of the wide crossing, high traffic volumes, high speeds, and poor sight lines.

The MDC's 1999 *Arborway Traffic Calming Study* recommended a pedestrian signal at this location. The Arborway Master Plan also recommends a pedestrian signal at this location. In fact, this signal protection is more important in the Arborway Master Plan because this is the recommended location of the Arborway's continuous shared-use pedestrian and bicycle path, and it connects to the existing paths around Jamaica Pond.

However, in the Arborway Master Plan, the signalization issue is complicated by the recommended inclusion of Pond Street (the segment between Prince Street and Eliot Street) as a signal-controlled approach. This approach is included in order to preserve the convenience of local access to the degree possible, and to improve safety for traffic using this access to the Jamaicaway. A review of the signal phasing and traffic operations at the new signal indicates that the Outer Arborway Northbound to Jamaicaway intersection approach would function with better operations than the Pond Street approach, so there would not be incentive to try to "short-circuit" a queue on the main Jamaicaway approach via Pond Street.

The Arborway Master Plan cannot complete a traffic signal warrant analysis for this location, because such an analysis would require traffic volumes over the course of a full day, as well as a detailed understanding of existing local traffic volumes and anticipated future volumes resulting from the recommended circulation changes. It is recommended that this issue be considered further in the context of changes to local circulation. Nevertheless, the traffic signal warrant review should take into account the current pedestrian and bicycle utilization of this location, the existing safety issues, and the importance of this location in providing a continuous, signal-protected bicycle / pedestrian pathway along the Emerald Necklace.

- **Upper Arborway / Centre Street / Orchard Street.** The Preferred Alternative proposes to control the Upper Arborway and Orchard Street approaches as a part of the Arborway Centre Street signalized intersection. The volumes on these streets most likely do not meet traffic signal warrants, but it is recommended that they be signalized as a safety issue because the proposed roadway reconfiguration places these approaches closer to the signal. In existing conditions, queues on Centre Street sometimes block Upper Arborway left turns, especially

during the AM peak hour. In the Preferred Alternative, the Upper Arborway intersection would be slightly closer to the Arborway intersection, and this condition would be worsened.

- **Arborway / Casey Overpass / Morton Street / Circuit Drive (current location of Shea Circle).** A formal traffic signal warrant analysis has not been completed, but traffic volumes at this location are considerable, and it is virtually certain that this location would meet traffic signal warrants.

**Water Main Impacts.** There are currently two 48-inch water mains running beneath the Arborway corridor. In the vicinity of Kelley Circle, these water mains are located beneath the rotary's central islands. To the south, toward Murray Circle, the water mains are located beneath the eastern median, between the Inner Arborway and the Outer Arborway Northbound. The Preferred Alternative entails significant roadway changes that could affect these water mains, especially in the vicinity of Kelley Circle, where the roadway would be realigned to run through portions of the central islands.

The water mains are located at least four feet below grade. Excavation for new roadway or new landscaped areas would be a maximum of two feet deep. Construction management plans should ensure that the water mains are not disturbed, and that excessive loads (e.g. dump trucks loaded with fill) are not run over the water mains if excavation has made the ground cover too thin.

Another issue is the presence of air ventilation stacks in the water mains at Kelley Circle. These ventilation stacks are placed at or near high points in water mains to enable air in the line to vent. There are vents for each of the two mains in the southern Kelley Circle traffic island near Pond Street. The Preferred Alternative's new Arborway alignment would pass through the location of these air vents. Therefore, the vents would have to be relocated, either by piping the vent stacks laterally into a median area, or by moving the vents to a new location along the water mains. This would require planning and coordination with the Massachusetts Water Resources Authority (MWRA).

## 6.6 Conclusion

Heavy volumes of high-speed traffic currently threaten the Arborway's roles as a historic landscape and as a linear park for the enjoyment of pedestrians and bicyclists. Since the Arborway's original design by Frederick Law Olmsted, Sr. and its completion in 1897, the parkway's design and function have been changed numerous times, always to the benefit of automobile mobility and to the detriment of the historic landscape and non-motorized users. The Arborway Master Plan was undertaken to identify a treatment plan that would enhance the character of the historic landscape and improve access for pedestrians and bicyclists, without creating unacceptable traffic congestion.

The Arborway Master Plan Preferred Alternative restores significant elements of lost Olmsted landscape by converting pavement to green space and planting appropriate trees and vegetation. The Preferred Alternative improves access for pedestrians, bicyclists, and park users by creating a clearly-marked continuous path along the Arborway, narrowing crosswalks, and providing signal-protection for every major crossing along the path. In order to achieve these landscape and pedestrian / bicycle improvements, the Preferred Alternative narrows roadways, consolidates roadways that are currently separated, reduces paved areas, and controls roadway access. By allocating pavement and traffic flows as efficiently as possible, the Preferred Alternative provides adequate vehicular access, with minor impacts to traffic operations and moderate impacts to existing traffic patterns.

The following are the principal elements of the Preferred Alternative.

### Historic Landscape

- The overall paved area is reduced and landscaped area is increased.
- Plantings appropriate to the original Olmsted design area increased, especially red oak trees in rows lining the roadways. These new plantings are facilitated by removing and replacing dead trees and trees in poor health, filling gaps in the tree rows, and extending the tree rows into newly-landscaped areas.

- Street furnishings are replaced with furnishings appropriate to the Arborway character.

### **Bicycle and Pedestrian**

- A continuous, off-street shared-use bicycle / pedestrian path extends the length of the Arborway, connecting Jamaica Pond, Arnold Arboretum, and Franklin Park. All major roadway crossings along the shared-use path are protected by traffic signals.
- In addition to the shared-use bicycle / pedestrian path, new sidewalks have been added throughout the Arborway to make the pedestrian network more robust and interconnected.
- Pedestrian crossings throughout the Arborway have been improved by improving the signal protection and/or narrowing the crossing width.

### **Motor Vehicle Traffic**

- Overall roadway area has been reduced, but the roadway design, traffic access control, and traffic controls have been designed to accommodate the major traffic flows. As a result, the overall traffic operations in the Arborway corridor are generally maintained, with some traffic movements experiencing slightly less congestion and some traffic movements experiencing slightly more congestion.
- Replacing some paved areas with landscaping helps to better control traffic access and traffic flows in the Preferred Alternative. This is especially important in the section of the Arborway between Kelley Circle and Murray Circle, where access controls help to enhance the landscape, reduce the paved area, direct motor vehicle traffic away from the residences and toward the Inner Arborway, and facilitate improved pedestrian and bicycle crossings.